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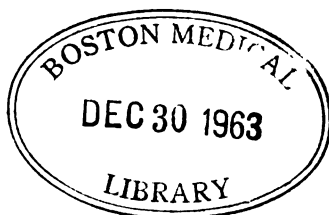
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THE STANDARD
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VOLUME II



W. H. Brewster

THE STANDARD FAMILY PHYSICIAN

A Practical International Encyclopedia of
Medicine and Hygiene Especially
Prepared for the Household

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Chronic dysentery is principally a disease of the tropics, and generally develops from the catarrhal form. After actual or apparent recovery from the latter affection, repeated relapses occur which finally develop into chronic dysentery. In other cases it commences at once as a chronic affection, with occasionally occurring diarrheas. The discharges from the bowels, usually five to six daily, are thin, often watery, and contain admixtures of mucus, blood, and pus. They are often distinguished by an offensive odor. Pains and tenesmus are only slight or are entirely absent. Sometimes diarrhea alternates with constipation. The stools may even for a short time assume a normal condition. If not treated, the disease may eventually be protracted for months and years, while the patients continue to emaciate and become anemic until, finally, they die from general exhaustion.

Treatment of dysentery until the arrival of the physician, who must be called as soon as possible in every case, consists in rest in bed, and in the application to the abdomen of linseed-poultices or poultices which become warm (see **POULTICES**); hot-water bags or thermophores will also render good services. The diet should consist of fluid nourishment only; best of boiled warm milk, or of gruel and flour soups. In order to prevent the spread of the disease, it is important that the stools of the patients and everything soiled by them, such as linen, toilets, night-stools, etc., should be thoroughly disinfected. See **DISINFECTION**.

DYSPEPSIA.—See **STOMACH, DISEASES OF**.

E

EAR.—For structure and functions see **INTRODUCTORY CHAPTERS** (pp. 70-72).

EAR, CARE OF.—The care and protection of the ear should begin with the nursing. In the infant the tympanic cavity, which later is filled with air, is at first full of mucus which may suppurate if the mouth or ear is unclean. Hence, cold should be avoided as it reduces the resistance of the infant and permits or aids infection. Water should not be permitted to enter the ears or the nose. A coryza, or cold in the head, may cause the Eustachian tube to become closed by swelling of the mucous membrane, and thus prevent the entrance of air into the middle ear. This disturbance may eventually be followed by deafness. After the bath it is necessary carefully to dry the folds behind the ears, as otherwise moist and obstinate eruptions of the skin may arise. Loud sounds should be avoided. A child that is addressed in a loud manner often cries because the noise causes pain in the ear.

A hood to press the lobes of the ear to the head is not only superfluous and without benefit, but possibly harmful. A bandage for this purpose is shown in Fig. 117. The best protection against diseases of the ear is afforded

by hardening the entire body (see **HARDENING**), which should begin as early as possible.

A healthy ear requires neither ear-muffs nor cotton-pledgets as a special protection against wind or cold; although it should be guarded against freezing during sleigh rides, hunting trips, etc. Neither does the healthy organ require any special care. If plenty of ear-wax be present, a daily cleansing with a soft, dry corner of a towel is sufficient. Even this cleansing should be omitted in small children. Ear-picks, hair-pins, and ear-brushes are unclean and unnecessary, sometimes even dangerous. They do not prevent, but cause, the accumulation of ear-wax, as well as affections of the auditory canal. To place pieces of cotton, onion, garlic, bacon, camphor, etc., into the ear in case of toothache is without benefit, and nonsensical.



FIG. 117. Bandage for pressing the ear-lobes against the head.

Piercing the ears for earrings is a barbarous custom, occasionally leading to inflammation and even to tuberculous degeneration of the lobe of the ear. The wearing of earrings as a protection against disease, is a foolish superstition still prevailing, especially in foreign countries. Frequent picking and scratching of the ear causes inflammation of the auditory canal; unnecessary irrigation of the ear with oil prepares the soil for obstinate accumulations of fungi leading to inflammations, earache, and disturbances of hearing. Nasal douches are fraught with danger to the ear; even the drawing of cold water into the nose may be harmful.

The ears are subject to new dangers when the children go to school. Pulling the ears is apt to cause contusions and inflammations of the cartilages, sometimes leaving permanent deformities of the lobe of the ear. Blows may lead to tears and to exudations of blood. By vigorous boxing of the ears the drumhead may be ruptured; even the labyrinth may be injured, and permanent deafness be the result. In cases of recent rupture of the drumhead, the layman should never attempt to pour anything into the ear, as incurable impairment of hearing is frequently the result of such an unsuitable procedure. In school, difficulty of hearing is often misjudged as stupidity, and unnecessarily punished. It is the duty of school physicians, therefore, to examine all children for defective hearing.

When diving head foremost during bathing, the drumhead is very apt to rupture. Likewise, when bathing in the ocean, a wave that is caught from the side instead of backward may injure the ear.

Loud sounds injure the faculty of hearing, particularly when occurring unexpectedly. Artillerymen and boilermakers, for instance, are extremely liable to deafness. Explosions and gunshots in closed rooms are also dangerous. Engine drivers who suffer from the shrill whistling of the locomotives and from long-continued standing upon the vibrating engine, are very liable to become deaf. To deaden the sound, small, light balls of cotton are used, which can be placed into the ear when necessary.

The public should be interested in this matter of hygiene of the ear, and should take steps to prevent unnecessary noises. A great deal might be accomplished by the prohibition of whip-cracking, the playing of hand-organs, and the burning of noisy fireworks, by the improvement of pavements, the regulation of noisy work, and by the division of towns and cities into factory districts and residence districts, etc.

Heredity exerts an influence upon affections of the ears, especially upon chronic, dry inflammation of the middle ear. The consultation of a physician before marrying is, therefore, advisable in certain cases. Marriages of near relations sometimes favor congenital deafness.

EAR, DISEASES OF.—Diseased conditions of the auditory apparatus may involve either the external parts of the ear (the *concha*), the external auditory canal, or the internal ear. Middle-ear inflammations (which see) usually proceed by way of the Eustachian canal, from the throat outward to the middle ear.

1. **Diseases of the External Ear** are usually due to injuries sustained as by blows or accidents which may lead to the formation of blood-tumors, to obstruction of the external auditory canal, or even to suppurative inflammation. The last-named condition may arise also from transmission of supuration from an inflammation of the middle ear.

Blood-Tumors are generally caused by violent blows upon the ear, which result in exudations of blood under the cartilage and skin, so that some parts of the ear swell. Such blood-tumors were of rather frequent occurrence in Roman and Greek gladiators, and are still found in wrestlers, prize-fighters, etc. Inmates of insane asylums occasionally suffer from this condition, which may be due either to their own violence or to rough handling by attendants. These blood-tumors usually disfigure the ear considerably.

Foreign Bodies are sometimes found in the external ear, those most frequently encountered being beads, shoe-buttons, beans, peas, seeds, paper balls, pieces of wax, and forgotten pledgets of cotton or onion. Flies, roaches, bedbugs, and fleas are rarely found in the ear; the so-called "ear-worm" never. The removal of foreign bodies from the ear never requires

great haste, and it is always possible to avoid such injuries of the organ as are frequently caused by the assistance of unprofessional persons hurriedly summoned. Living animals are destroyed by injections of glycerin or alcohol. This being accomplished, the aid of an ear specialist may be called at leisure. Unskilled assistance may cause severe injuries which may eventually lead to loss of hearing, or even to death.-

Until the ear has been examined by a physician with the aid of an ear speculum, it may in many cases remain doubtful whether the supposed foreign body is in the external auditory canal at all; and not a few dangerous operations have been performed by untrained persons to remove a foreign body which was not present. On the other hand, a dead object which does not swell may often remain in the auditory canal for years, even for decades, without endangering the ear.

Acute Inflammation of the auditory canal may be due to the transmission of middle-ear suppuration, to mechanical injuries caused by scratches, foreign bodies, etc., or to burns resulting from the injection into the ear of hot substances. Most frequently, however, the inflammation is due to the formation of furuncles or pimples in the external ear. The furuncle begins in the membrane of the auditory canal as a small, red point, and is very painful to the touch. It is usually situated near the external opening of the ear, and may either recede of itself or go on to suppuration. The pain and swelling generally diminish after the discharge of a small quantity of bloody pus.

Furuncles rarely occur singly, and after their first appearance they are apt to recur at intervals, so that the symptoms of the disease may come and go for weeks, causing restless nights, and impaired nutrition in consequence of the pain experienced on chewing. Many persons are especially predisposed to furuncles.

Scratching and habitual picking of the ear should be avoided, as it often gives rise to the formation of furuncles. These are also frequently transmitted from one ear to another by means of contaminated ear-picks and similar objects. When occurring in large numbers, furuncles may cause considerable swelling which closes the auditory canal and impairs hearing; but the patients always recover. The pain which results from inflammation of the auditory canal may be alleviated by the application of hot poultices or by alcohol compresses.

Chronic Inflammation of the skin of the auditory canal is usually painless, leading merely to the discharge of an increased quantity of ear-wax. In the auditory canal this combines with the cast-off particles of skin to such an extent that it can be removed only with difficulty and only by a physician. Small scales and dry particles are discharged from the ear at brief intervals. Itching is the most conspicuous disturbance. Irrigations of the ear should be avoided as they may aggravate the condition.

2. **Diseases of the Internal Ear** affect that part of the organ which is situated internal to the drum-membrane. The most common of these is inflammation of the middle ear, which may occur as a catarrh with mucous accumulations in the tympanic cavity, or as a suppuration with a purulent condition of the inflammatory exudations. These forms differ from each other largely in the degree of intensity, taking into consideration also the factor of infection.

Acute Catarrh of the Middle

Ear usually begins with sudden, piercing pain in the ear, with ringing and beating, and with a sensation of obstruction. If the function of hearing is not impaired, only an inflammation of the tympanic membrane (the drumhead) may be present; if the acuity of hearing diminishes, the middle ear is usually involved also. A rise of temperature is often present, and may be very marked in children, leading to spasms, and frequently disturbing the general health to such an extent that confusion with other affections may occur. All the disturbances increase in intensity during the night; and the act of chewing is often a very painful process.

If perforation of the drumhead takes place, the pains usually cease, but not the fever. A sense of fulness and pressure, difficulty of hearing, and ringing of the ears may persist. Sometimes perforation occurs during the first twenty-four hours of the disease, causing a flow of bloody mucus; at other times it may take several days, and incision into the drumhead must often be resorted to in order to relieve the patient of his pain. In cases of simple catarrh of the middle ear, the drumhead usually heals in a few days, provided infection does not take place.



FIG. 119. Ear-syringe

Injectations of oil into the ear, so widely used, tend to introduce bacteria into the organ, thus adding the factor of infection. Patients should be confined to bed, and small cotton pledgets soaked with antiseptic solutions should be used to cleanse the external ear, while great care should also be taken to keep the mouth and nose as clean as possible. Hot-water bottles are often very grateful to the patient, as they diminish the pain of an earache. Breathing hot smoke into the ear is sometimes of service, but if the little patients are unable to sleep



FIG. 118. Ear-bandage.

by reason of the pain, the inflammation is usually acute enough to demand operative treatment of the ear-drum.

Purulent Inflammation of the Middle Ear ("running of the ear") begins as a simple catarrhal process, but the disease is more acute and the symptoms more marked. Beating sounds like the strokes of a hammer occur, and the entire side of the head becomes painful. Chewing is often very difficult, and even the concussion caused by walking intensifies the pains which are scarcely endurable, especially at night. The general symptoms in children are sometimes so severe as to resemble a meningeal inflammation.



FIG. 120. Mode of washing out ear with syringe.

Violent chills are frequent. Perforation of the drumhead takes place under turbulent manifestations, and the purulent discharge is often so profuse that the pillow or bandage may be soaked by it. In cases of severe suppuration it may happen that large portions of the drumhead, and even the ossicles are lost. Such severe cases are met with at times in measles and scarlatina, and may result in complete deafness. Sometimes the external auditory canal becomes inflamed also, or the affection may spread to the mastoid process. See MASTOID, DISEASES OF.

The disease may terminate in (1) recovery without permanent changes; (2) in scars or permanent perforation of the drumhead; (3) in loss of the ossicles of the middle ear or contracted scar formation of the middle ear with permanent difficulty of hearing; (4) in transition into chronic suppuration; or (5) in death from involvement of the brain. The occurrence of purulent suppuration of the middle ear may be favored by frequent

attacks of nasopharyngeal catarrh, and by enlargement of the tonsils, especially of the nasopharyngeal tonsil. The most serious cases of the affection are encountered as complications of scarlatina.

Examination and treatment by a specialist is imperative, and the belief that "running of the ears" is of little significance, or is even conducive to health, is thoroughly obsolete and pernicious. Running of the ear is a serious matter, and the advice of a layman is not reliable. The pain may be allayed by hot compresses, fomentations, linseed poultices, etc. Cold air and cool baths must be avoided. The extension of the process to the mastoid cells or to the meninges is accompanied by high fever, by headache, by soreness behind the ear, and by other localizing signs. These cases need operation, and usually without delay. Chronic suppurative disease of the middle ear is not common. It requires operative treatment as a rule.

EAR, ITCHING OF.—A sensation due to a persistent eruption in the auditory canal, which sometimes is accompanied by the secretion of moisture, at other times by the casting off of dry scales. The affection is difficult to cure, irrigations tending only to aggravate the condition. Scratching and picking of the ear are most apt to lead to furuncles of the auditory canal. See *Diseases of the External Ear*, s. v. **EAR, DISEASES OF.**

EAR, POLYPI OF.—Peduncled tumors which arise as a result of persistent suppurations of the ear, mostly when the bones are affected by the pus. They should be looked upon as tissue proliferations. By obstructing the auditory canal they cause a retention of the pus, which may lead to dangerous consequences. Sometimes these polypi become so large that they project from the ear as bleeding pieces of flesh. They are easily removed with a snare or with a sharp spoon.

EAR, RINGING OF.—A frequent symptom which may be due to various causes. When due to **EAR-WAX PLUGS** (which see) it is readily curable. Often it is a symptom of deep-seated affections of the ear, such as chronic catarrh of the middle ear; in other instances it is of nervous origin. In some cases the sounds are sizzling, buzzing, or hissing; in others they resemble ringing, chirping, or whistling. Ringing in the ears may at times give rise to aberrations of judgment (hallucinations); but the symptom which consists in perceiving sounds that nobody else can hear is not a sign of an affection of the ear, but of a mental disease. If the ringing is incessant, the results of treatment are less hopeful than when it occurs only occasionally. Before deciding upon any plan of treatment it is necessary to determine the cause of the ringing. It often happens that patients become accustomed to the buzzing sounds, and cease to notice them. Sometimes, however, the affliction is so marked that hearing is greatly impaired; and it may cause mental depression, and even suicidal intentions. External noises, such as the bustle of the street, music, etc., deaden the sensation, whereas the quiet of the night intensifies it.

Brief, occasionally high-pitched, ringing of the ear, which is heard like the fine ringing of glasses, is a normal phenomenon. If it persists for some time, or if it recurs regularly, there is scarcely any possibility of curing the condition. Muscular spasms of the internal ear occasionally cause a brief, flapping or crackling noise which is without significance. The muscular noises are at times so loud that they may be heard, not only by the patient, but even by other persons at some distance. The most common cause of mild buzzing in the ear is chronic catarrhal inflammation of the middle ear. This affection frequently leads to deafness.

EAR-TRUMPET.—See HEARING, DEFICIENCY OF.

EAR-WAX PLUGS.—Yellowish to brownish accumulations of fat excreted from the glands in the skin of the auditory canal. Sometimes these plugs are so large and so hard that they represent an actual cast of the auditory canal. They are removed by first softening them with oil or soap-water, and then irrigating the ear. The symptoms of the condition are ringing, itching, and difficulty of hearing; in very rare cases it may give rise to nervous cough, and to spasms.

ECLAMPSIA, INFANTILE.—A nervous affection of infants, characterized by convulsions. This symptom, which may appear in milder or severer forms, is never a disease of itself, but is always a result of other affections. The most common causes are: beginning measles, diphtheria, scarlatina, meningitis, catarrh of the stomach or intestine, cholera morbus (most important), constipation, inflammation of the lungs, purulent inflammation of the ears, and intestinal worms. The milk of an intoxicated wet-nurse has been known to give rise to convulsions resembling eclampsia. It is highly doubtful if mental excitement or anger on the part of the wet-nurse may be regarded as possible causes of the condition. In the majority of cases the symptom occurs in children afflicted with RICKETS (which see), especially when the bones of the skull are involved. It is incorrect to ascribe the appearance of convulsions to teething.

In the milder forms, which occur usually in children less than a year old, the children sleep with the eyelids half open, showing the eyeball turned upward. Slight twitchings of the muscles of the face occur, creating the impression that the child is smiling. It sometimes happens that the limbs convulse slightly; that the hands are clenched with the thumbs under the fingers; and that breathing is irregular, alternately deep and superficial, slow and quick. This condition is popularly known as "silent spasms."

The severer form, which often closely resembles an epileptic convulsion, comes on suddenly as a rule. Sometimes, however, it occurs in connection with the "silent spasms" previously described, quite independent of whether the child is asleep or awake. Infants become unconscious and cry aloud; older children grind the teeth, stare, squint or roll the eyes, toss the head

back, and throw the body backward. The limbs are alternately drawn in and thrust out, or are held spasmodically rigid or twisted. The lower jaw is sometimes opened and closed with a snap; respiration is suspended; the face turns blue; foam appears at the mouth; and gas, excrements, or urine may be passed involuntarily. Sometimes death occurs during the attack. The duration of the convulsions varies; they usually last only for a few seconds, but often for several minutes. Eclampsia may come on in single attacks, or it may recur. After the attack the child is weak, listless, and generally sleeps for hours.

During the attack it is necessary that all bands and constricting dresses be loosened, and that respiration be stimulated by dashing cold water on the face or chest of the patient. The thumbs may be left clenched under the fingers, but the child should be guarded against injuries. Until the arrival of the physician, who should be summoned at once, attempts may be made to arrest the spasms by a warm bath (95° to 104° F.), or by an enema consisting of $\frac{1}{4}$ pint of vinegar and $\frac{1}{2}$ pint of hot water. Hot foot-baths are sometimes of service.

ECLECTICISM.—See MEDICINE, HISTORY OF.

ECZEMA.—See SKIN, DISEASES OF.

EGG.—An article of diet which consists of the germ and food-yolk extruded from the ovary of a bird, usually of the domestic hen, and which is enclosed in a calcareous shell. It is a common practise to stir up the yolk of an egg with the soup intended for a sick person, while the white is reserved for other purposes. This is a great mistake, for although the nutritive value of the yolk is considerable, this depends largely on the fat present; while the amount of albumin contained in the yolk, compared with that in the white, is in the proportion of 15 to 25. The white, however, does not consist solely of albumin, this being present only to the extent of 13 per cent., while water constitutes another 85.9 per cent. On an average, 50 grams of eggs is the food equivalent of about 40 grams of meat and not quite $\frac{1}{3}$ of a quart of milk, so that a pound of meat is cheaper than a like quantity of eggs, leaving aside the fact that the salts contained in meat largely increase its food value. The value of eggs as food must neither be overrated nor underrated. Their wide employment is extremely essential, for they may be incorporated with numerous dishes, not only increasing their food value but also their palatability.

It is important to know that fresh eggs are moderately transparent and that this transparency disappears as their age increases. Moreover, if placed in a 5 to 10 per cent. solution of salt, old eggs sink to the bottom of the vessel. These tests are well enough for the gormand, but the practical housewife will find the same nutritive values in eggs which have been preserved by artificial means, provided no decay has taken place; and the variations in transparency and weight which accompany increasing age are

merely due to the loss of water through the more or less pervious shell. In all cases where it is intended to add strength and nourishment to a dish the entire egg should be used, and not the yolk only. Stirring an egg in soup is the most effective way of giving this food; while the most unsatisfactory is to allow the patient to drink a raw egg, for in this instance the albumin is coagulated in the stomach in lumps, of which only the outer surface is attacked by the gastric juice, while the interior may remain undigested and be wasted. Boiled eggs are therefore to be preferred to raw eggs, and those in which the white is coagulated and the yolk still somewhat fluid are easiest to digest. But even the hard-boiled egg will not "lie like a stone in the stomach" if the precaution be taken to masticate it thoroughly. Lack of attention to this point will impair the digestibility even of the soft-boiled egg, the point being to prevent the albumin from reaching the stomach in large masses. A hard-boiled egg may be digested readily and without difficulty by even a weak stomach, and the nourishment thoroughly used up by the body.

ELATERINUM.—A neutral principle obtained from the juice of the fruit of a cucumber-like plant, *Ecballium elaterium* ("Squirting Cucumber"), a native of the Mediterranean regions of Europe and Asia. The principle is an active cathartic, causing large, watery stools even in doses of $\frac{1}{10}$ grain. The passages are usually unaccompanied with much pain, and on this account the drug is generally used in combination with other cathartics. It has been used in times past to relieve local effusions of dropsical fluid.

ELECTRICAL ACCIDENTS.—The maximum tension of an electric current which a human being can endure is about 500 volts. The alternating current as a general thing is more dangerous than the direct current, and fatalities have been reported where the individuals grasped two conductors in which the tension of the alternating current only slightly exceeded 100 volts. Alternating currents produce a muscular spasm, so that it becomes difficult to release the conductors, whereas the powerful blow of the direct current throws the person away.

Strong electric currents momentarily inhibit respiration and make the heart beat slower; if the breathing is suspended for any length of time, the heart also stops. The victim of a severe electric shock is usually rendered unconscious. This condition may last for several hours and may then be succeeded by a feeling of exhaustion, vertigo, headache, and an irritable and irregular pulse. Where the current enters the body it may cause swellings, burns, or bleeding into the subcutaneous tissue; or there may be formed the curious branching striæ shown in Fig. 121, and the skin may be perforated. These branched markings are commonly seen following lightning burns. They have nothing to do with standing under trees, or the like.

In extending assistance to a person who has been shocked, it is well for the rescuer to exercise certain precautions in order that he himself may not be affected by the current. The wire or other conductor may be removed with a dry stick or other non-conducting material. If this is not possible, the rescuer should insulate himself by standing on some non-conducting substance, by putting on rubber-gloves, or by wrapping the hands in some dry articles of thick clothing before pulling the injured individual away from the source of the electricity. The current may also be drawn off into the earth by throwing a metal chain or similar object over the live wire. If the injured person hangs suspended from a wire, care must be taken that he is not hurt by falling. Where the body can not be extricated from the tangle of wires, it may be lifted in order to interrupt the current; or the victim may be insulated by the placing of clothes, boards, or other non-conducting articles under those parts which come in contact with the earth.



FIG. 121. Markings on the body of a person killed by a stroke of lightning.

If the injured person is unconscious he should be undressed, a folded coat placed under his shoulders, the tongue drawn forward, and attempts made to bring on voluntary respirations by tickling the nose and pharynx. If this is unsuccessful, ARTIFICIAL RESPIRATION must be resorted to, and the heart stimulated by administering hot tea or coffee.

ELECTRICITY, THERAPEUTIC APPLICATIONS OF.—Electrotherapy was first used in the eighteenth century, although scientific investigations regarding the nature and effects of the electric current in its applications to the human body were not instituted until the nineteenth century. Notwithstanding the numerous and laborious experiments and observations, very little is known of the manner of its action. But one thing is certain in spite of the many doubters, and that is that many patients are improved and their illness shortened by the applications of this agent. Its value in motor and sensory paralyses is undoubted, and the quieting and analgesic influences attendant upon its use form one of the main indications for its employment.

The principal forms in which electricity is ordinarily applied are (1) by the continuous or galvanic current; (2) by the interrupted or faradic current; or (3) by the Franklin current. In recent years a number of additional varieties of currents have been devised, but these demand the test of time before they can be more generally employed. In order that the use of the electric current may be efficacious and successful, it is necessary

to determine the proper strength needed, and the time of application. This, however, is such a difficult matter, and requires so much experience that only a physician should employ this agent in the treatment of disease. Laymen are very apt to use electricity without the exercise of any judgment or reason, basing its use on the maxim "the stronger, the better." A warning note should be sounded against this misuse of a very powerful therapeutic measure. Very often a weak, almost insensible, current may be of greater value and efficiency than one which is so strong that it can scarcely be endured by the patient.

As applied by the laity, the current can only do harm; and the lack of tangible results usually serves to condemn this measure in the popular estimation. Neither may the "electrification" as made use of in exhibitions and country fairs be compared to its employment by the medical practitioner, as the antics produced in the victim are merely of value in amusing the surrounding spectators. One who desires to be benefited should therefore consult a physician, and not entertain any fears about any possible hurt or injury. In many cases currents that are weak and easily endured are sufficient. If stronger varieties are required, the patient may be accustomed to their effects by the aid of special appliances attached to the electric apparatus, by means of which a slow and scarcely noticeable increase of the current is rendered possible. The patient may thus be made to endure a current of considerable strength, which would be productive of great distress if it entered the body suddenly. It is only in a small number of conditions, however, that the stronger forms of current are necessary.

Electricity is employed also in the electric water-bath, electric light-bath, and for heating certain instruments (such as needles, snares, and cauteries) which are used for the purpose of removing unsightly moles and hairs, or for excising polypi or thickenings in the nose. In addition to its curative properties, electricity is used also in examinations, for testing the irritability of nerves and muscles, and for illuminating internal organs, etc. For the value of X-rays in diagnosing disease, see **DIAGNOSIS AND TREATMENT OF DISEASE** (p. 94).

ELF-LOCK (PLICA POLONICA).—A closely knotted or entangled mass of hair, matted together by the sticky discharge of ulcers, moist sores, or open wounds of the head. Lice may or may not be present in connection with this condition, which is usually due to uncleanness and neglect. This uncleanly disease, which is particularly indigenous to Posen, Poland, and Russia, can be treated only by cutting off the elf-lock, a procedure which is absolutely without danger.

ELEPHANTIASIS.—A condition which commonly affects the legs, and which consists of a chronic, uniform swelling, usually of the portion below the knee, and including or omitting the foot in its effects. In rare cases it may involve also the thigh (see Fig. 122). The disease may be caused by

repeated inflammations of the skin, lymphatics, or blood-vessels, or by chronic moist eczemas. That form of the disease more commonly found in the tropics than in temperate climates, and which constitutes the true elephantiasis, is due to a parasite which is present in the blood of the affected individual. Some relief may be afforded by elevation of the limb, by enveloping the same in bandages of flannel or rubber, by various applications, and by massage. Although ordinarily harmless, the condition is extremely annoying, and where the weight of the leg becomes unbearable, it may be necessary to resort to surgical measures. See *FILARIA*.

EMACIATION.—Excessive loss of flesh. The main indication of good health is a uniform body-weight; that is to say, the weight of the healthy, normally developed body should show neither marked gains nor marked losses. A loss should always be looked upon with suspicion, and faulty nutrition must be regarded as the cause. This is the case when the amount of nourishment absorbed is insufficient, either because the quantity of food taken does not suffice for the needs of the body, or because the composition of the diet is such that the nutrient materials required to sustain strength are not incorporated. On the other hand, certain abnormal conditions of the body (such as diabetes) may be present which interfere with proper assimilation; or the powers of absorption may have been diminished below the requisite limits. This latter condition is present in almost all diseases, but it is most marked in those involving the alimentary tract. Not only does the disease itself cause more or less disturbance in the body economy, but the accompanying loss of appetite adds to the danger. The enforced rest to which a sick person is subjected reduces, of course, the demands upon his strength, but a certain amount of expenditure always takes place as long as the heart acts and breathing continues. In addition to these causes, must be considered the wasting effects of fever and the loss of bodily strength brought about by suppurative processes. It is a fortunate circumstance, that the demands which disease occasionally makes on the body are compensated for by the stores of fat and muscular substance which generally have been accumulated during periods of health. The loss of these affords the outward manifestations of emaciation. In this manner the internal organs



FIG. 122. Elephantiasis in the lower extremities.

are not called upon to contribute to the demands made by the illness in order to sustain life; and their vital functions are not made to suffer.

EMBOLISM.—Term designating the occlusion of a blood-vessel by some matter which has been carried along by the blood-stream. The obstruction (*embolus*) may consist of a clot of blood, of a small mass of disintegrated tissue thrown off by an inflammatory process, or of fat which has entered the vessel in consequence of injury. When such an embolus occludes one of the great arteries of the heart, sudden death will ensue. If the occlusion be only partial, it usually results in more or less severe disturbances of nutrition in some parts of the body, giving rise to inflammation or gangrene. Partial occlusion of the pulmonary artery, for instance, may result in gangrene of the lungs. Embolism of a cerebral artery is one of the causes of apoplexy (see BRAIN, APOPLEXY OF). The entrance of air-bubbles into the blood-stream likewise causes occlusion of the vessel, and frequently results in sudden death.

EMETICS.—See DOMESTIC REMEDIES; VOMITING.

EMPHYSEMA.—See LUNGS, DISEASES OF.

EMPIRICISM.—See MEDICINE, HISTORY OF.

EMPHYEMA.—See PLEURISY.

ENEMA.—A fluid injection passed into the rectum. According to the purpose which it is desired to accomplish, distinction is made between three forms of enemas: (1) those introduced in order to cleanse the bowel, as in constipation, or to remove irritants in diarrhea; (2) those used to supply water to the body or to influence the kidney secretions; and (3) those introduced for the purpose of nourishing the body (nutrient enemas).

Cleansing enemas serve to remove constipated or hardened masses of feces. They are of great service also in non-constipated patients, in whom it seems necessary to empty the large intestine. Fluids answering the purpose are: water of varying temperature (even icy cold); water with the addition of soap, salt, or vinegar; oils of various kinds; glycerin, etc. The quantity of water used for an enema varies from one pint to two quarts. Glycerin is injected with a special syringe (see Fig. 123) in doses of from two to five grams. Oil may be introduced in the same manner, the usual dose being a few tablespoonfuls. Larger quantities should be used only in certain modes of treatment for persistent constipation. The injection is made by means of an irrigator of glass, tin, or rubber, which should preferably be supplied with an olive-shaped (but always rounded) nozzle (see Fig. 124). Special enema syringes, the smaller ones of which hold from two to thirty grams, and the larger ones a pint or more (see Fig. 125), are especially useful when oil or glycerin is administered. Water may be injected into the rectum also from a glass funnel supplied with a rubber-hose. The fountain-syringe so widely used in the United States is the best medium for giving an enema. The injection should always be made very

slowly and with but slight pressure. The bag, therefore, should not be held at too high an elevation. Injuries to the rectum by the nozzle of the syringe or of the irrigator can always be avoided by careful handling.

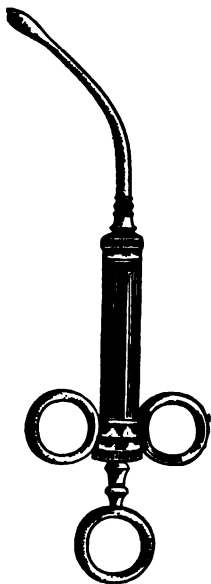


FIG. 123. Glycerin syringe.



FIG. 124. Irrigator.



FIG. 125. Hard-rubber syringe.

For small children one-half to one pint of water is sufficient. To children of a few years of age, and to nurslings, enemas may be given by the fountain-syringe or by means of a small rubber-ball with a cone-shaped nozzle (see Fig. 127). The fluid drawn into the ball is squirted into the rectum with slight pressure. The patient should be placed properly for the ap-

plication of an enema, best upon one side of the body, or with raised buttocks; the anus must be easily accessible and visible, and the closing muscle (the *sphincter*) should be carefully drawn apart and greased with oil, vaselin, or lanolin, in order to render the introduction of the tube painless. The injected oil or water loosens and softens the fecal masses, also stimulating the movements of the bowel, so that after a short time the injection is again ejected, more or less intermixed with the intestinal contents.



FIG. 126. Fountain syringe.



FIG. 127. Balloon syringe of soft rubber.

This may occur in several efforts, sometimes very shortly after the injection, in other instances not until several hours have passed. The selection of the fluid for the enema must be left to the physician. A lukewarm soap solution may be recommended as sufficient for ordinary purposes. Many persons gradually learn to administer cleansing enemas to themselves, even when standing or sitting.

Medicinal enemas are given for the purpose of introducing certain remedies into the rectum, from which they are absorbed and become effective. The reasons for this method of administering medicines depend upon the type of the disease, upon the character of the remedy, or upon the personality of the patient. The medicine in question is dissolved in a small quantity of (usually watery) fluid which is injected into the rectum with a small glass or rubber syringe. An insane person, for instance, who refuses to take medicines, may be given a narcotic by means of an enema. Medicines which are liable to be vomited, especially when they are to be given repeatedly, may likewise be readily introduced into the body in this manner. Large quantities of olive-oil are frequently administered by means of an enema, as, for instance, in the treatment of gall-stones. If worms are present in the lower bowel, enemas are injected which contain narcotizing or germicidal substances, such as garlic, tobacco, quassia, gentian, etc.

Nutrient enemas are employed when a patient is not able to take nourishment in the usual manner; as in cases of a constricted esophagus, or in stomach-diseases (as ulcer or cancer) which are accompanied by constant vomiting. To prevent progressing emaciation, nourishment is administered by the rectum, as this portion of the intestine is capable of absorbing fluids and foodstuffs in solution. It is not possible, however, to nourish a patient sufficiently or permanently in this manner. At most three-quarters of the required amount of nourishment can be administered to a patient by rectum; yet, notwithstanding a more or less steady loss of weight patients have been kept alive on nutrient enemas for months, even for years. Nevertheless, it is practically only in cases of emergency that this form of feeding is practised. As a rule it is not resorted to until the patient takes less by mouth than can be administered to him by enema into the rectum.

The quantity of food in a nutrient enema should be small, but it must be of high nutritive value. Numerous experiments have shown that milk enemas are among the most suitable. The nutritive value may be increased by the addition of eggs and sugar, or cooked starchy food. The addition of wine or brandy is also customary in many cases. It is necessary always to add a small amount of salt to an enema in order to facilitate its absorption. An excess of salt is, however, disadvantageous. Nutrient enemas should not exceed half a pint in quantity, as larger amounts are retained only with difficulty. The food should be heated to body temperature, and should be introduced slowly and under slight pressure, with an

irrigator, a glass funnel, or a syringe. The most suitable position in which to place the patient while administering an enema is upon a pillow, with raised buttocks, or in a bending position with the elbows resting upon the knees. Nutrient enemas should be given two or three times a day, or even more if retained well; and they should be preceded, at least in the morning, by a cleansing enema, so that the food is not thrown out by an evacuation of the bowels.

ENTERITIS.—See DYSENTERY; INTESTINES, DISEASES OF.

ENURESIS (WETTING THE BED).—At about the end of the first year, or at least during the second, children should be taught how to keep themselves dry during both day and night. When normal and mentally sound children wet the bed after they are three years of age; this is due to a disturbance which has been termed *nocturnal enuresis*. This condition occurs not only in weak and sickly children, but also in those who are apparently in the best of health. It may be due to a variety of causes, as worms, stone in the bladder, a contracted prepuce, masturbation, epilepsy, or to enlargement of the nasal or pharyngeal tonsils. During waking hours the child is able to voluntarily retain the urine until a suitable time arrives for evacuating the same, but during sleep this control is often lost. Involuntary urination occurs, therefore, usually while the child is sleeping, and only rarely while it is awake. The urine is freely voided during the first few hours after the child falls asleep and less often during the early morning hours. The act may or may not be followed by the awakening of the child; it may be repeated night after night, or at least several times a week. There may be longer or shorter intervals of freedom from the symptom, but it is very apt to return. If the condition remains uncared for, it may persist for many years, even up to the time of puberty, when it generally disappears of itself, although it has been noted up to the twentieth year.

The treatment demands some experience and a great deal of patience. It must be borne in mind that the condition is rarely due to naughtiness or laziness, but that it is much more apt to be due to an inherent weakness in the child. Bodily weakness can not be corrected by scolding, ridicule, or punishment. On the contrary, this only intensifies the evil by frightening the little patient; and later medical treatment is rendered much more difficult. The following remedies may first be tried. Supper should consist of solid food only, without any fluids, unless it be some gruel. For two or three hours before bedtime, no fluids of any kind should be given to the child. Carbonated waters, tea, and coffee may exert a very deleterious influence. The child should go to the toilet immediately before retiring. The most suitable thing for the child to lie upon is a hair mattress covered with some impervious material, as a rubber-sheet, or a piece of oilcloth. In many cases a cure may be effected by elevating the legs and pelvis by placing pillows under them, or better yet, by raising the foot of

the bed about fifteen inches. This procedure favors the collection of the urine in the upper portion of the bladder, so that a greater amount must necessarily accumulate before the opening of the urethra is reached, thus rendering more prolonged retention possible. This method, however, can be practised only with older children.

During the day the child should be instructed to hold the urine for intervals of time gradually increasing from two-three-four-five hours, etc. In obstinate cases the child may be awakened several times during the first few hours of the night, and urged to urinate. If a child going to school suffers from this complaint, he should be permitted to empty the bladder frequently, and it is advisable to arrange short recesses between the individual lessons. If these measures prove insufficient to correct the trouble, it may be necessary for the physician to resort to medicine, hypnosis, or electricity. Massage of the bladder has been attended with excellent results in some cases. In weakly children various tonic measures, such as baths, exercises, etc., must also be considered. Punishment is only to be thought of where laziness can be traced as the cause of the evil, but it is advisable to omit even this as well as all other methods of torture, the application of which is intended to prevent a sound sleep. The observation that a lateral posture seems less frequently attended with enuresis, has led to the practise of tying rough brushes and knotted towels to the child's body in such a manner that the child is made uncomfortable when it attempts to lie on its back. This procedure is cruel and unnecessary. Warning must be given in regard to the many secret remedies which are claimed to cure the condition without fail, but which in reality are entirely inefficacious.

ENZYME.—See FERMENTS.

EPIDIDYMISS.—See INTRODUCTORY CHAPTERS, s. v. ORGANS OF GENERATION (p. 74).

EPIDIDYMITIS.—Inflammation of the epididymis; an affection most frequently arising as a complication of acute gonorrhea (which see), although it may complicate also a chronic gonorrhea. It may occur at any time after the onset of the gonorrhea (usually after the second week), and is due to an extension of the infection, exercise and sexual excitement being factors in aiding this extension. Epididymitis comes on very acutely as a rule. There is considerable swelling of the testicle, with intense pain and heat. Not every inflammation of the epididymis, however, must be ascribed to gonorrhea; there is also a tuberculous affection of the organ, and the inflammation may sometimes be caused also by a blow or a fall. Finally, an epididymitis due to gonorrhea may be followed by a tuberculosis of the organ, particularly if a tuberculous predisposition be present.

The significance of gonorrheal epididymitis lies in its very protracted course (the mildest cases usually persisting two weeks), and the scars that remain. A permanent functional disturbance may follow; and if both

epididymal bodies become involved in the course of one or several attacks of gonorrhea, sterility is not an infrequent result.

Tuberculous epididymitis usually terminates in suppuration with the formation of a fistula. The only possibility of effecting a cure in such cases lies in the removal of the testicle and epididymis, provided the body is otherwise healthy.

To limit the chances for the occurrence of gonorrheal epididymitis it is advisable to wear a suspensory bandage, to rest as much as possible, and to avoid instrumentation and too strong injections into the urethra. If in the course of a gonorrhea there occurs a sudden (mostly one-sided) pain in the testicles, the patient should at once go to bed and apply cooling compresses (cold water is sufficient) until the physician arrives; but the compresses must be changed often to be efficacious. It is beneficial also to place the affected parts in a raised position, to suspend all local treatment of the urethra, and to keep the bowels open by means of cathartics.

EPILEPSY.—A disease of the nervous system, occurring periodically, and characterized by disturbances of consciousness. It is usually, though not invariably, accompanied by complete loss of consciousness and by convulsions. All the causes of the disease have not yet been fully determined. Heredity is probably of considerable importance in the etiology, for the descendants of epileptic, mentally deranged, or alcoholic parents are frequently afflicted with the disease. Alcohol plays a very noteworthy part, as about one-third of all chronic alcoholics become subject to epilepsy. Marked psychic disturbances, such as a severe fright, may prove the immediate cause for an epileptic convulsion; but this can only happen where the system has been prepared, as by hereditary tendencies, etc. A healthy normal person never becomes epileptic from fright alone. It is necessary to distinguish a primary from a secondary epilepsy, the latter being due to an injury to the brain or to the irritation of cicatrices along the nerve-roots. The great majority of the epilepsies are due to injuries to the brain at birth. The disease may come on at any time of life, but it occurs more frequently during childhood and youth. Very often the so-called "teething cramps" are of epileptiform nature.

During a severe seizure the patient falls down unconscious, sometimes first uttering a loud cry. The body becomes rigid, the head is bent backward, the limbs are extended, and the face becomes blue owing to the difficulty in breathing. A few moments later the entire body manifests convulsive movements—the head is tossed about, and the limbs are jerked violently. Tight contraction of the jaws often produces an injury to the tongue, so that bloody froth shows at the mouth. Urine and feces may also be voided involuntarily. The attack lasts only a few minutes. The convulsions cease, the body relaxes, respiration again becomes free, and the patient awakens without any recollection of what has taken place, the only

evidence of what has occurred being marked by the lacerated tongue and a feeling of fatigue which he experiences. Patients are usually very drowsy following an attack. Very often an attack may be presaged by peculiar sensations (the AURA) lasting but a few seconds or minutes. These are chiefly characterized by a variety of nervous manifestations, rush of blood to the head, palpitation, etc.

Aside from this complete attack there is another and less violent variety which is marked by a brief transitory fainting-spell, vertigo, or unconsciousness. If these patients are suddenly overcome while reading, eating, or otherwise occupied, they will be observed to stare in an absent-minded way, and then continue whatever they have been doing as if nothing had happened. Of the seizure itself, they are absolutely ignorant.

An epileptic attack may come on at any time, day or night. Patients with nocturnal attacks are often unaware of the condition for a long time.



FIG. 128. Hospital with 35 beds for acute cases. (Craig Colony for Epileptics)

A seizure may readily be induced by mental disturbances, exhaustion, or by a debauch. Sometimes as many as forty or fifty attacks may occur in one day, and may cause death from overexertion of the heart-muscle. A single attack, although an alarming sight, does not endanger life.

The conduct of most epileptics changes during the progress of the disease. They become irritable, quarrelsome, and egotistic; and if their wishes are not satisfied they get very much excited, and even belligerent and brutal. A distrustful and insistent manner is often combined with a certain amount of bigotry and hypocrisy. Their sense of the truth is often blunted, and their oath in court is not to be trusted. In other patients there is rather a diminution of mental capacity—a narrowing of their horizon of observation; and a certain mental deterioration enters into the foreground of their symptoms. In the course of the succeeding years this mental weakness may develop into actual idiocy, especially if the epilepsy was present before the development of the mind was fully completed. In addition to the continuous disturbances of the mental functions, the attacks may be

accompanied by more transitory disorders of the intellect, in which a clouding of consciousness is the most marked characteristic. This may go on to delirium, with hallucinations, fright, and great excitement. These patients are a source of danger, and many homicides are committed by them while in an epileptic state.

The mild disturbances of the intellect (*psychic equivalents*) are not always recognized—especially when the severer types are kept in mind—because to the untrained observer the patients do not give any outward impression of being in any way mentally disturbed. They may merely seem somewhat confused or slightly intoxicated; and in this condition they may commit various crimes, such as arson, larceny, etc. They are in doubt

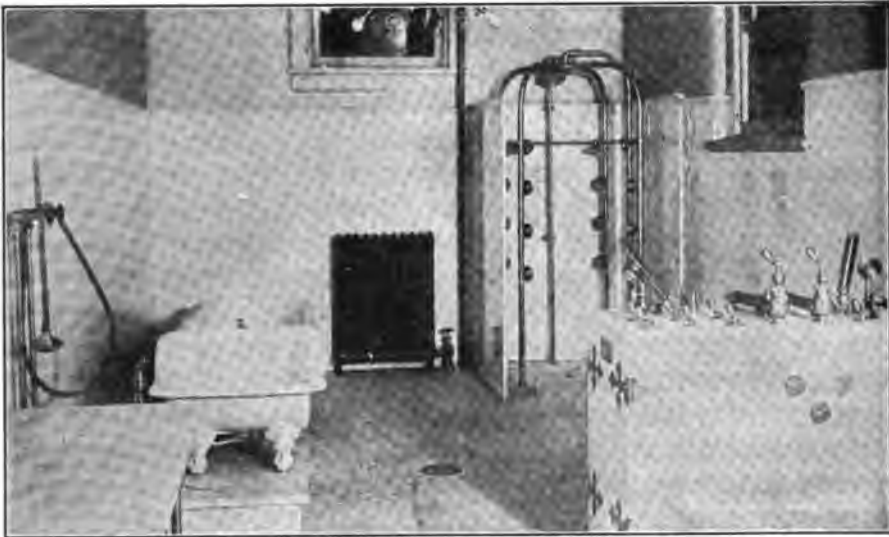


FIG. 129. Section of hydrotherapeutic room, showing operating-table. (Craig Colony for Epileptics)

as to their own mental status, and search in vain for a suitable excuse for their shortcomings. Such excuses as are finally devised are not even accepted without restrictions by themselves; and they generally wind up their statements with the formula "I do not know how I came to do this." Patients of this kind may undertake prolonged journeys, and when they finally come to in some foreign place they are unable to explain how or why they got there. It is important for a criminal judge to be acquainted with the fact that the recollection of any given act, such as a larceny, may not be erased for some short period of time after the crime has been committed; but as soon as the cloud over the intellectual faculties is lifted, all memory of the act is lost. A prisoner thus afflicted will affirm what he has done while he still remains in this morbid state of mind, only to deny every recollection of the act when his normal condition of mind returns. It is possible to refer to these as instances of double consciousness, similar to those met with in

other abnormal mental states such as hysteria, sleep-walking, and hypnosis. It is scarcely necessary to call attention to the possibility of simulation in these people, but there is no doubt that many epileptics have been unjustly convicted of crimes which they committed while under the influence of the epileptic attack. It is often a most difficult matter to come to a decision in these cases, and a knowledge of insanity is necessary for proper judgment.

Intoxication in epileptic patients is a serious condition. Even a small quantity of alcohol excites them, and renders them dangerous. Some are thrown into a condition of fury and brutality by the ingestion of only a few glasses of beer. The alcoholic state is likewise followed by a loss of every recollection of the event. It must be expressly noted that a case of epilepsy



FIG. 130. Section of hydrotherapeutic room, showing steam-cabinets and massage-table. (Craig Colony for Epileptics)

may be marked only by the psychic phenomena just described, without there having been at any time any evidences of convulsive seizures. The mental disturbances of the kind described, and not the convulsive attacks, are therefore the essential characteristics of epilepsy.

Epilepsy is very often a curable disease. Sometimes it disappears without any definite method of treatment having been used; and this accounts for the occasional "cures" by quacks. The latter have largely exploited this field of medicine, and all the nauseating remedies which characterized the pharmacopœia of the middle ages have been and are still being employed by them. But only one drug has withstood the stress and storm of medical criticism, and that is *bromin* and its derivatives. These preparations should always be given under medical supervision in order to obtain the desired effects; they should therefore never be recommended carelessly among the laity, who may employ them without the exercise of any discretion.

Nor should any attention be paid to the statements of quacks who publish tirades against the bromides, and label them as poisons, yet incorporate them in their own secret preparations. The necessity for direct medical supervision must not only be extended to the giving of the drug, but also to the manner of living, for one is a necessary accompaniment of the other. Many an epileptic might have been cured if these admonitions had been obeyed. Diet and open-air occupations are of even more importance than the bromides.

Epilepsy originally due to injuries to the nerves or the brain, may sometimes be cured by surgical procedures. The hope has been entertained that primary or idiopathic epilepsy might be similarly benefited, but thus far no results of any consequence have been secured.

Dangerous epileptics must be confined in institutions organized for this purpose, and this also applies to those who are mentally weak and helpless, unless provision can be made for them in their homes. In the United States, epileptics are only too frequently herded with almshouse patients or with the insane. Such treatment is neither economically nor medically justifiable. New York state has led the way in the founding of the Craig Colony for Epileptics, at Sonyea, an enlightened and just manner of dealing with this class of defectives. Fortunately other states are following the lead.

As a rule an ordinary attack of epilepsy can not be aborted. All that can be done is to remove all tight articles of clothing, to place a pillow under the patient's head, and to take care that he does not injure himself in his convulsive struggles. All attempts made with the object in view of relieving the convulsive rigidity of the fingers or limbs are of no value whatever; neither may anything be accomplished by sprinkling the patient with cold water.

EPSOM SALTS.—See MAGNESIUM, SALTS OF.

ERGOT-POISONING.—Ergot is a poisonous, mold-like fungus which grows over and into the grain of rye and replaces its substance. It is a horn-shaped, usually curved body, dark violet on the outside and white inside; and it is most poisonous immediately after the harvest. Rye infected with ergot is often ground into flour and used for food (particularly in impoverished countries), with the result of acute or chronic poisoning. During the middle ages, in years when the crops were bad and widely infected, veritable epidemics of ergot-poisoning occurred.

The symptoms of acute poisoning by ergot are chiefly connected with the gastro-intestinal canal, as salivation, retching, vomiting, and diarrhea; and with the nervous system, as itching sensations resembling the creeping of ants on the arms and legs, headache, and vertigo. In some severe attacks, convulsions, delirium, and unconsciousness may occur. The poisoning terminates in recovery in a few days, rarely in death.

Chronic ergot-poisoning (*ergotism*) is observed in two chief forms. True ergotism is characterized principally by a most annoying itching in fingers and toes, also in the trunk and limbs, and by extremely painful muscular spasms which may be aggravated to epileptiform convulsions and lock-jaw. A second general type, *gangrenous ergotism*, shows symptoms of itching, pains in the back, and convulsions, followed by dry gangrene of the fingers or toes, which may even drop off. Not only fingers and toes, but also hands, feet, arms and legs may suffer by this dry gangrene. The timely suspension of the use of food-stuffs containing ergot stays the disease, and recovery takes place. Continued use of such foodstuffs, on the other hand, will lead to protracted illness, and may even cause death under symptoms of convulsions and exhaustion. Even in cases of benign course, however, there may remain trembling and numbness of the fingers, curvature of the limbs (see Fig. 132), and weakness of the nervous system.



FIG. 131. Ergot.

A. Rye with infected grains. B. An infected grain, enlarged. C. The sprouting fungus. D. Enlarged head of fungus.

At the first sign of poisoning, the ingestion of food containing ergot must be stopped, and a physician should be consulted. Bread containing ergot is usually damp, and full of violet spots; it smells disagreeably, and leaves an unpleasant, tickling sensation in the throat. The disease is prevented by careful cleansing of the grain, and by cautioning and instructing the populace. Owing to improved methods of cultivation, strict hygienic inspection, and to the importation of sound grain during years of failure of the crops, epidemics of ergotism are now rare. In Russia, Italy, and Spain they still occur, less frequently in other parts of Europe, while this form of poisoning is practically unknown in the United States.

ERUCTION.—Belching of wind; one of the most frequent and disagreeable evidences of gastric disturbance. The material belched forth consists of air or of various gases—nitrogen, hydrogen, carbonic acid, sulfureted hydrogen, etc. Air is always to be found in the stomach, being swallowed alone or with the food. The other gases are formed in the stomach by the fermentation or putrefaction of various food remnants. In a

normal, healthy stomach there is practically no stagnation of the contents, and bacterial disintegration does not take place. Fermentation is usually the result or accompaniment of gastric weakness, especially of dilatation of the stomach. Very often acids (hydrochloric, acetic, etc.) are also belched forth, and may be recognized by their acrid or burning taste when they enter the mouth. These acids are evidences of fermentation of the contents of the stomach. The eructation of air, as a rule, is only the result of abnormal nervous irritability of the stomach, and therefore has not the same importance attached to it as the belching of other gases or acids. The so-called heartburn, which is also a form of acid eructation, may be associated with nothing but a hyperacidity of nervous origin. It is a not infrequent accompaniment of hasty eating, particularly if a large part of the diet has consisted of hot bread and fatty foods.

The difference in the varieties and causes of this condition makes it evident that there can be no single method of overcoming it, but that treatment in each instance must be directed to the original causative factor. Where gastric fermentation is present, it is necessary first of all to improve the atonic condition of the stomach. This may be accomplished by washing out the stomach, in addition to other methods. In

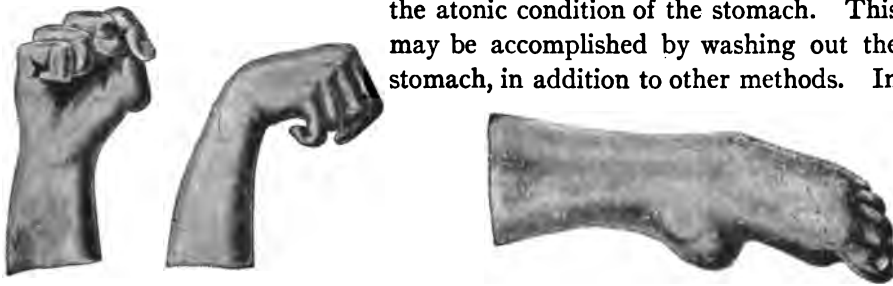


FIG. 132. Deformities caused by chronic ergot-poisoning.

acid fermentation the hyperacidity may be neutralized by various alkaline remedies, such as bicarbonate of soda, and by strict adherence to a prescribed diet. In all cases it is extremely necessary to regulate the bowels carefully. Sedatives are often useful in the nervous variety of eructation. The details of treatment should always be referred to the medical attendant.

ERUPTION.—A general term for changes in the skin which are more or less circumscribed, and which run a well-marked course. According to their form and behavior they are designated as *macular*, *papular*, or *vesicular* eruptions. This does not afford a sufficient distinction, however; for there are many eruptions which are similar in form, but which differ in their origin and course. *Maculæ* may be red, bluish-red, yellow, brown, or white. Flat, red maculæ which project slightly above the level of the surrounding skin are known as *hives* or *urticaria*. *Papulæ* are firm, circumscribed elevations of the skin, and their shape may be round, crescent, oval, or otherwise. *Vesicles* and *blisters* are elevations of the thin, outer layer of the skin, and are filled with fluid. If the fluid dries up, a crust re-

sults. A similar crust is formed by the drying of the blood and serum which comes from a superficial abrasion. Certain eruptions consist of cast-off portions of the epidermis mixed with the oily matter from the skin, and collected in scales. The condition known as dandruff is an example of this form of eruption.

ERYSIPELAS (ROSE-RASH).—An inflammatory disease of the skin, accompanied by fever, and caused by the entrance of certain micro-organisms (*cocci*). It always starts from an injured part of the skin or mucous membranes; either from a more extensive wound or from an insignificant abrasion which is apt to be overlooked. The open wounds may be the result of injuries, of childbirth, of infection of the navel in the newborn, or of operations; or they may be due to scratching or needle-pricks.

The most frequent form of this disease is erysipelas of the face, which usually originates in the injured mucous membrane of the nose. It is not always necessary, however, that an injury precedes the occurrence of erysipelas. The entrance of the bacteria may be favored by disorders which cause a break in some part of the skin or of a mucous membrane, such as skin eruptions of the nose or ears, fetid nose (*ozena*), discharge from the ears, and coryza. Many persons who are periodically affected by erysipelas suffer from such disorders, and escape the erysipelas when the original complaint is cured. Fright and colds are not factors in causing the affection. Epidemics of erysipelas were formerly frequent in the surgical wards in hospitals, but following the discovery of the cause of the disease, they have become rare.

The first symptom of erysipelas is usually a violent chill, followed by high fever. Soon afterward there appears on the skin a red, painful, elevated spot which rapidly increases in size, advancing either with round contours or in tongue shape. In many patients the onset of the inflammation of the skin occurs simultaneously with the fever. The affected skin is painful to the slightest touch. It is pink to copper-colored, smooth, glistening, tense, and hot. A striking characteristic is the sharp definition of the inflammation, the affected parts being sharply demarcated from the healthy skin. When the affection spreads over the entire body, or over the greater part of the body, it is spoken of as *wandering erysipelas*. Erysipelas of the face or head rarely advances further downward than to the nape of the neck. Usually it is restricted to the face, the ears, and the hairy part of the head.

The duration of the inflammation is from four to five days, sometimes longer. The outer skin is then cast off in small bran-like scales or in large flakes. Mild infections usually heal in a few days; cases of medium severity require about a week. In very rare cases the disease may last more than two weeks. An exception to this rule is seen in wandering erysipelas. If the poison of the disease is marked, severe general symptoms develop.

There may be violent headache, delirium, and stupor; the tongue is dry and covered with crusts; the appetite is lost. In rare cases complications, such as meningitis, pleurisy, or inflammation of the kidneys, may constitute serious dangers. As a rule, however, the course of the affection is a favorable one. Erysipelas is distinguished from the exanthemata (measles, scarlet fever, etc.) in that recovery from an attack does not make the patient immune to subsequent infections. On the contrary (as is often the case also with articular rheumatism and bronchopneumonia), a diminution in the power to resist the affection is noted.

As to the treatment, it is in many cases unnecessary to resort to energetic measures. It is sufficient to relieve the painful tension and the susceptibility to drafts of air by a plentiful application of oil, vaselin, or cold-cream to the skin, and by covering the same with a warm dressing. Dusting-powders may be used instead of fats. Cooling drinks (selters, lemonade, etc.) may be useful in allaying the fever, and an ice-bag to the head is grateful. Attention must be paid to regular movements of the bowels. The falling-out of the hair does not require any special treatment, as it grows rapidly upon recovery. A marked sensitiveness and irritability of the skin often remains for some time after the disease-process has ceased. It is wise, therefore, to protect the skin on first exposure to the air.

Although the affection often heals spontaneously without treatment, it is always necessary to consult a physician. In the first place it is of paramount importance to determine whether the affection is actually erysipelas. If not, the physician can reassure the patient and his friends, and thus spare them unnecessary excitement.

Erysipelas and conjuration are intimately correlated in the beliefs of many people, and it is the opinion of the superstitious that a sufferer from that disease must needs have it conjured in order to be cured. This belief is widely disseminated, particularly in European countries, not only among the rural population, but also among the dwellers in cities. It is not at all rare that the physician pays his visit in the morning, while in the afternoon the "wise woman" murmurs her magic words at the patient's bedside. It seems almost unnecessary to say that conjurations or charms are absolutely without any effect. Every insignificant inflammation, every innocent red spot on the skin, may be mistaken for the much-dreaded erysipelas. Such slight disorders disappear rapidly and spontaneously. Also mild forms of erysipelas may heal in a few days without having caused any severe symptoms. In such cases the patient usually waits for two or three days before sending for a "wise woman," and it may frequently happen that the spontaneous disappearance of the disease takes place simultaneously with, or soon after, the administration of the magic treatment. It being the inclination of human beings to ascribe every occurrence to a visible and tangible cause, the patient will rather connect the improvement

in his condition with the conjuration or charm or "absent treatment" which he is able to see or hear, than with the forces of nature which work silently in his body. For this reason superstitious patients often deceive themselves as to the cause of the improvement.

The prevention of the disease may in many cases be accomplished by protecting fresh wounds from contamination, and by timely treatment. The physician should be consulted as early as possible; as for instance when the navel-wounds of nurslings have an unhealthy appearance. It is of the highest importance that all rooms which have been occupied by erysipelas patients, or in which they have been treated, should be thoroughly disinfected. The bacteria of erysipelas are possessed of great vitality and resistance. They are difficult to kill, and may remain adhering to the walls or to the floor of the sick-room, causing the disease to appear in susceptible individuals, or to recur in persons previously affected. It is a criminal thing for a person with erysipelas, even of the mildest type, to come anywhere near a recently confined woman. The chances are very grave that the uterus may be infected with the erysipelas-germ, and that blood-poisoning will develop, possibly with deadly consequences.

ESOPHAGUS, DISEASES OF.—The esophagus, or *gullet*, is a membranous tube about nine inches in length, which is connected with the stomach, and which serves as a passageway for food (see **INTRODUCTORY CHAPTERS, s. v. ORGANS OF DIGESTION** [pp. 55-56]). It is subject to a number of affections, which may be caused either by the material ingested, or be due to morbid changes in its various tissues.

Cancer is the most frequent and dangerous of all diseases of the esophagus. The tumor is generally situated where the esophagus enters the stomach; sometimes its site may be in the middle, rarely at the beginning of the gullet. Cancer develops very slowly, insidiously, at first hardly perceptibly. It may often exist for months before difficulty in swallowing sets in. On account of the increasing stricture of the esophagus, this difficulty becomes more and more marked until only liquids will pass, and finally not even these. The danger of starvation can be avoided only by artificial feeding through the rectum, or by gastrostomy. Up to the present time medical skill is perfectly helpless when confronted with cancer, and even surgery is not yet able to remove these growths from the esophagus.

Contractions of the esophagus occur principally in consequence of corrosion of its mucous membrane by acids or alkalies which have been drunk either with suicidal intent or by accident. This causes ulcers which heal as scars. These scars contract the caliber of the esophagus and cause difficulty in swallowing; at times this may be so severe that it becomes impossible to take food, and the patient is in danger of starvation. Sometimes the physician succeeds in gradually enlarging the contracted parts by stretching the esophagus. At other times, however, it becomes

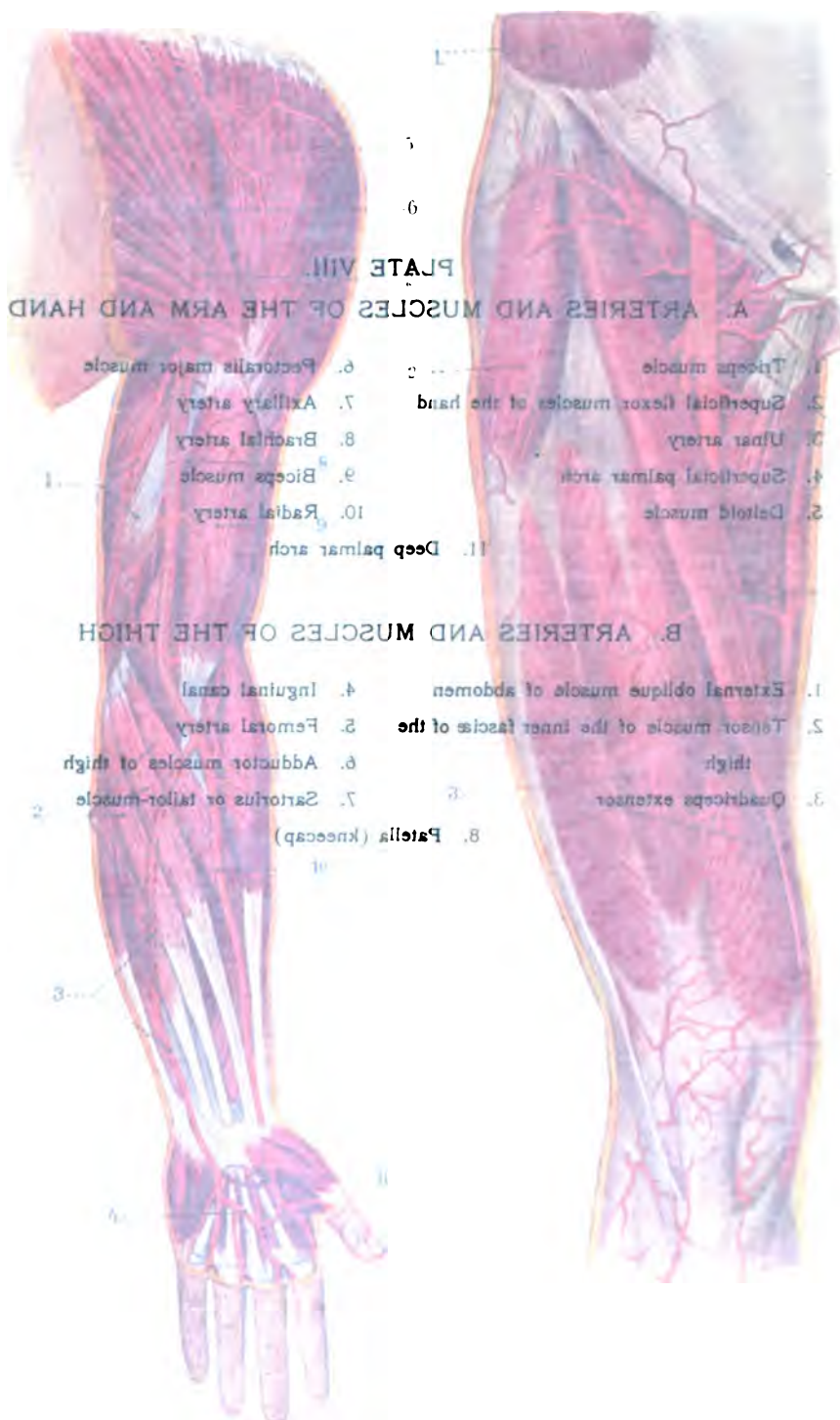


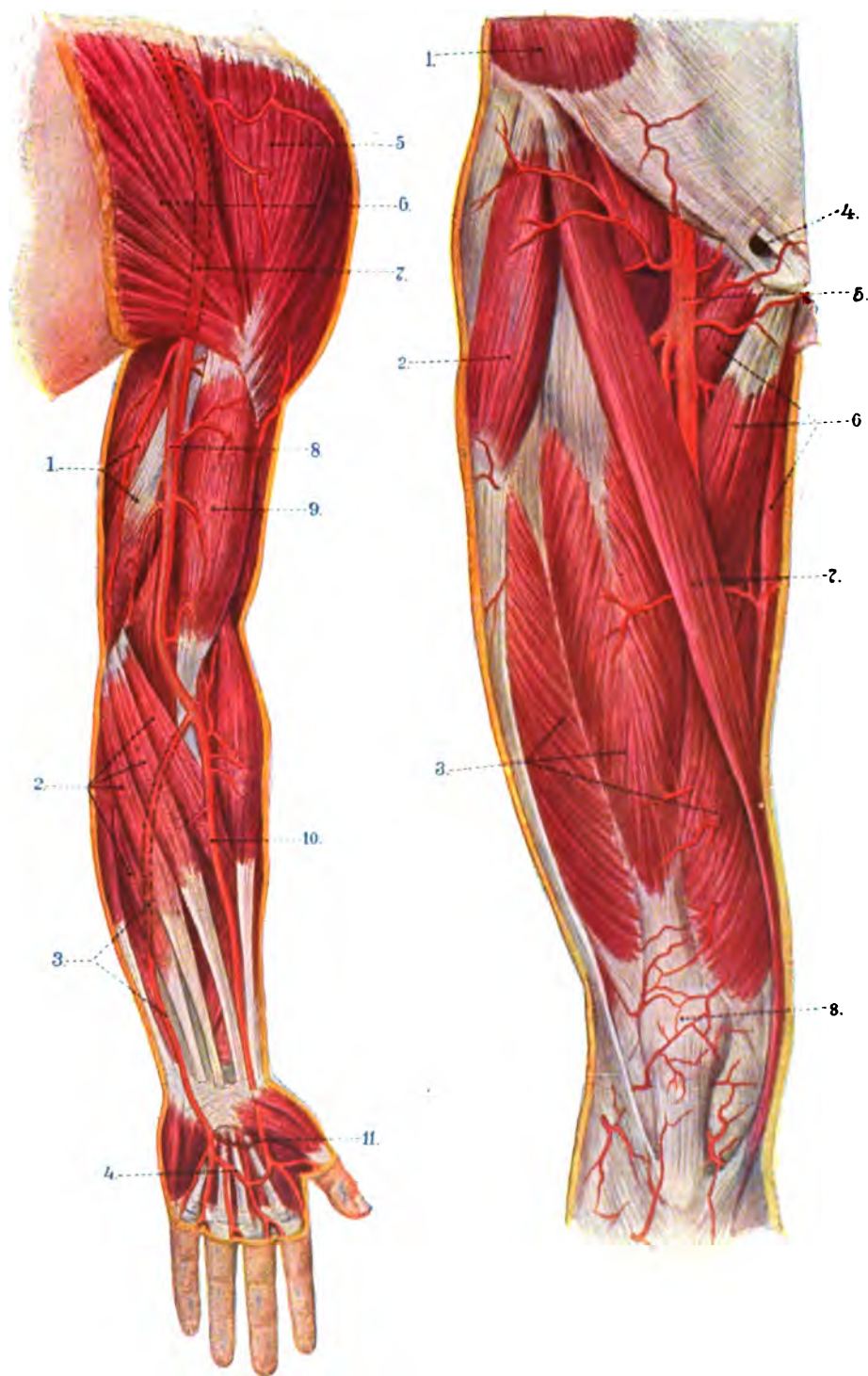
PLATE VIII.

A. ARTERIES AND MUSCLES OF THE ARM AND HAND

- | | |
|---|----------------------------|
| 1. Triceps muscle | 6. Pectoralis major muscle |
| 2. Superficial flexor muscles of the hand | 7. Axillary artery |
| 3. Ulnar artery | 8. Brachial artery |
| 4. Superficial palmar arch | 9. Biceps muscle |
| 5. Deltoid muscle | 10. Radial artery |
| 11. Deep palmar arch | |

B. ARTERIES AND MUSCLES OF THE THIGH

- | | |
|---|-------------------------------|
| 1. External oblique muscle of abdomen | 4. Inguinal canal |
| 2. Tensor muscle of the inner fasciæ of the thigh | 5. Femoral artery |
| 3. Quadriceps extensor | 6. Adductor muscles of thigh |
| | 7. Sartorius or tailor-muscle |
| 8. Patella (kneecap) | |



necessary to perform the operation of gastrostomy in order to nourish the patient.

Dilatations are situated chiefly in the upper, seldom in the lower part of the esophagus. They cause difficulty in swallowing, because the food may remain for hours and days in these dilatations, thereby obstructing the passage. The food often decomposes, and produces a foul odor. It may finally be vomited up. Generally the only cure is found in operative treatment.

Spasm of the esophagus is always of nervous origin; generally speaking, it is a rare sign of nervous weakness. The symptoms, which are nearly identical with those of real contraction of the esophagus, consist in trouble in swallowing the nourishment taken, even fluids. The spasms come and go, their appearance being very uncertain. It is a tedious but harmless complaint, which generally yields to proper medical treatment.

ESOPHAGUS, FOREIGN BODIES IN.—Foreign bodies not infrequently find their way into the pharynx or the esophagus. Teeth, teeth-plates, bones, needles, fish bones, etc., are often swallowed accidentally, and may remain in the pharynx or in the muscular wall of the esophagus, generally lodged sideways. They cause contraction of the esophagus, and more or less severe trouble in swallowing; at times they may give rise also to inflammation and suppuration of the wall of the esophagus. If the foreign bodies do not fall accidentally into the stomach, or are not ejected by vomiting, it is best to try to displace them by encouraging vomiting. This may be accomplished by tickling the pharynx with the handle of a spoon, or by introducing the finger. It may sometimes be possible to grasp the foreign body with the fingers, and thus to remove it. If these attempts are fruitless, and if the patient is suffocating, place him with his chest toward the wall and strike his back with short strong strokes between the shoulder-blades. The air which is thus forced from the lungs may carry the foreign body with it if it be lodged at the junction of the windpipe and esophagus.

If the object has already been swallowed, as will be seen from the fact that the patient can eat and drink without hindrance, he should be allowed to eat plentifully of cooked potatoes, so as to envelop the possibly pointed or sharp object, and thereby avoid injury. Swallowed coins are generally harmless, and pass with the stools. No time should be lost before summoning a physician, who, with his technical knowledge, and with the aid of special instruments, can generally remove the object quickly, or if necessary thrust it into the stomach; while the layman would be making fruitless endeavors. If needles or other dangerous articles have been swallowed, and if they do not pass after a few days, operative removal may be necessary.

The swallowing of objects could often be avoided; for instance, by removing artificial plates from the mouth before retiring, by eating more

carefully, and by abolishing the habit of holding pins and the like between the teeth.

ESSENTIAL OILS.—See OILS, VOLATILE.

ETHER, ACTION OF.—Ether acts as alcohol, and others of the marsh-gas series, but being more diffusible its effects come on much more rapidly and are recovered from more quickly. Its main actions are primarily to impair consciousness, then to cause muscular excitement, then loss of muscular power, and finally anesthesia and loss of all sensation. It is important that ether-vapor be given well diluted, otherwise it may induce very dangerous collapse. When a patient is fully under the influence of ether, the heart-action is slightly slower than normal, as are also the respirations. The body is flushed and warm; blueness indicates trouble with breathing. The pupils are moderately contracted and all consciousness is lost. The involuntary movements of a patient, as well as the cries and groans that he may utter during an operation, are the results of the narcotic, and not the response to painful sensations. Patients should not take ether immediately after having eaten, as ether often brings on vomiting attacks, which may cause suffocation. Patients with false teeth should always inform the physician of this fact before being anesthetized, so that they may be removed. Following anesthetization, patients are often sick at the stomach. Cracked ice, carbonated waters, cold champagne, etc., are useful in the treatment of this condition. Etherization is a very safe procedure, and should not occasion any special fear on the part of the patient. See also the article on ANESTHETICS.

EUCAIN.—See COCAIN.

EUCALYPTUS.—The dried leaves of *Eucalyptus globulus*, a large forest-tree which is native in Australia, and extensively planted in India, Italy, California, and other tropical and subtropical regions. The active principle of the leaves consists of a volatile oil of very complex structure. It has the characteristic action of other volatile oils, being a powerful antiseptic, deodorant, and irritant. It is largely used for nose and throat medication in the treatment of various forms of catarrh of those regions. It has been assumed that the eucalyptus-tree is capable of curing malaria, but this is an erroneous belief which has its origin in the circumstance that mosquitoes are rarely observed in the neighborhood of these trees. The reason for this, however, is that the eucalyptus-tree, being a very active and rapid grower, and having very large leaves, can absorb immense amounts of water. In common with other large trees, it is capable of drying up marshy places, thereby eliminating the breeding-places of the mosquitoes, and consequently the mosquitoes themselves. The dearth of mosquitoes, especially of certain forms, brings about the elimination of malaria; but the digging of ditches and the thorough drainage of the marshes would secure the same results as the planting of the eucalyptus. The effect is not due to any vital

property of the tree, but solely to its ability to absorb large quantities of water from the ground.

EUONYMUS.—A large shrub, *Euonymus atropurpureus*, grown abundantly east of the Mississippi; the dried bark of its root is used in medicine as a cathartic. Its active principles are bitter substances. *Euonymin*, considered to be a glycosid, is a very active stimulant to the flow of bile, and it is through its irritation of the intestinal tract that it serves as a cathartic.

EUPATORIUM.—The dried leaves of *Eupatorium perfoliatum* (boneset, or thoroughwort), a plant very widely distributed throughout the United States. In popular medicine it is used extensively in the form of an infusion of the leaves, which contain a trace of volatile oil, resin, and bitter glycosides of uncertain composition. Used in a hot infusion, the action of the heat and the volatile oil is that of a quickly diffused stimulant, causing increased flow of urine, and increased perspiration. Boneset is therefore utilized to aid in the breaking-up of a cold. It is also a mild cathartic and emetic.

EUSTACHIAN TUBE, CATARRH OF.—The passage by which the ear communicates with the nasopharyngeal space is called the Eustachian tube (see Fig. 6o). All acute inflammations of the nose and of the pharynx (especially coryza and tonsillitis), as well as enlargement of the nasopharyngeal tonsil, inflammations and ulcers in the nasopharynx, and polypi of the nose, may cause an obstruction of the Eustachian tube; this will prevent sufficient ventilation of the middle ear, and produce a sensation of fulness and dulness in the ear, impairing the acuity of hearing. No serious disturbances remain if the catarrh is cured in time and its cause removed. See EAR, DISEASES OF.

EXCITEMENT.—In the healthy person the mental condition designated by this name is merely transitory, but if prolonged or frequently repeated, it may become a true psychic disturbance. This pathological state of excitement often appears as a symptom of considerable importance in many nervous, hysterical, epileptic, alcoholic, and other mental diseases. Under certain circumstances it may lead to a condition of actual confusion, in which the patient may do harm not only to himself but also to others. It is advisable to keep such persons under appropriate supervision, by the aid of two nurses if possible. They should be put to bed and kept there, as complete rest in bed affords one of the best means of combating this state of excitement. In addition, warm baths and hot packs are also of value. Of drugs it is sometimes found necessary to employ various sedatives and hypnotics.

EXERCISE.—Rest and activity constitute the two great antitheses of medicine, upon the alternation of which the life of every portion of the body depends. The rules for rest and exercise are among the most difficult problems concerning which the physician must decide. Rest is enjoined in

cases of severe illness or chronic disease, in order not to weaken the system, and to afford an opportunity for new energy to be gathered. During the progress of the recovery, exercise is again gradually taken up. In any given case of illness these questions always arise: when shall the patient be allowed to sit up; when may he leave the bed; when may he walk about the room; and finally, when shall he be permitted to leave the house?

The length of a walk must be carefully determined, taking into account the weather conditions as regards temperature, humidity, and the wind. It should be firmly impressed upon the patient that, in medicine at least, one walk of half an hour is a great deal more exercise than two walks of fifteen minutes each. Later on these walks, which may be taken indoors during unfavorable weather, may be supplemented by respiratory exercises. As a rule the pace should be set at 80 steps to the minute, weaker patients taking but 60 steps, and those more robust from 100 to 120 steps. Breathing may be regulated in accordance with the number of steps. For example, the act of inspiration may be made to extend over three steps, and expiration over another three steps. Finally permission may be given to do some climbing, but the ascent at first must be very mild in degree, and here also the respiratory movements may be accommodated to the number of steps. Oertel recommends an inspiration extending over one step and the succeeding expiration including two steps. The climbing of stairs requires the greatest amount of exertion.

Proper exercise is necessary, not only for those who are or have been ill, but also for those in good health. A well person remains so if every organ is regularly active. Organs which are not thus exercised, soon degenerate. Those persons who live close to nature, as it were, must of necessity exert themselves bodily in order to provide for their daily wants; but a large number of individuals, because of the altered conditions brought about by modern civilization, are called upon to take but little bodily exercise, and perform most of their tasks in closed rooms. This applies particularly to persons who follow some calling where mental activity predominates, and of these there are many in our modern cities. Even our periods of recreation are very apt to be spent indoors, and are not characterized by any bodily exertion, for most people remain at home, or seek entertainment at public places of amusement.

Persons who follow sedentary pursuits take but little bodily exercise, and it is incumbent upon them to find some substitute for the labor which was formerly demanded by nature. Gymnastics and outdoor sports meet this requirement to a large extent. The hours of labor in almost all occupations take up about one-third of the day, and after allowing a sufficient time for rest and sleep there remains a certain number of hours which may be devoted to recreation and amusement. The importance of devoting a portion of this time to regular bodily exercises must not be underestimated.

The variety of exercise is to some extent immaterial, whether it be walking or some other form of activity, so long as it is done with regularity. All who follow this advice will soon note the physical benefits derived. The various groups of muscles are brought into a condition of constant tension, although this varies in degree. This tension induces a continuous irritation of the sensory nerves within the substance of the muscles, and this irritation is transmitted through the spinal cord to the brain where it is communicated to the nerve-cells. From these the impulses are sent back to various parts of the body, affecting particularly the blood-vessels and the heart. The arteries in the vicinity of the active muscles are dilated, and an increased amount of blood finds its way to the limbs which are in motion.

The heart is influenced in three ways. In the first place the individual beats are lengthened; secondly, they become stronger and more efficient; and thirdly, the cardiac muscle is brought into a condition of tension. On this condition of alternating muscular and nervous activity depends the well-being of the body. *Mens sana in corpore sano* ("a sound mind in a sound body") is a quotation which applies as well to-day as it did in antiquity. An unnatural mode of life, combined very often with insufficient exercise, has resulted in a loss of health to many persons, and the proper exercise of the body will restore a great many of these to a normal condition. In conclusion it must be urged upon all who are healthy, to cultivate a regular system of exercise as far as the spare time at their disposal allows, and if possible it should be carried out in the open air.

EXHAUSTION.—This term is applied to the feeling of general bodily and mental fatigue which usually follows severe bodily or mental exertions, prolonged sleeplessness, continued excitement, forced marches, athletic or sexual excesses, alcoholic indulgences, and all other influences which do harm to the body, such as hemorrhages and convulsive seizures. Enforced rest, and avoidance of the cause of the trouble, are the principal curative measures which aid in restoring the normal condition of the system. Cool baths and sponging, fresh air with plenty of sunlight, and short walks are also to be recommended. Exhaustion may usually be avoided by a sensible adherence to alternating periods of work and relaxation. A different cause, however, underlies those conditions of apparent fatigue which precede the appearance of a contagious disease, before the nature of the latter can be determined. These are merely the evidences of an infection, and are usually marked by pain in the joints, disinclination to any effort, depressed spirits, and other indefinite signs. In such cases it is well to call in a physician.

EXOPHTHALMIC GOITER (known also as **BASEDOW'S DISEASE**, and as **GRAVES' DISEASE**).—Morbid protrusion of the eyeballs, with goiter, and disordered action of the heart. The disease was described in

1843 by a German physician. Basedow, and also by Graves, an Englishman. It usually appears in families where there is present a tendency to nervous diseases, and the hereditary element can often be directly traced. The affection is found more often in women than in men, and usually comes on during the early years of adult life. Its appearance is in many cases preceded by conditions which run down the system, by severe diseases, by subjection to intense mental excitement, and by overexertion. The trouble begins with palpitation and a sense of internal unrest, and with tremors, debility, and weakness. After a time the characteristic evidences of the disease appear: a moderate enlargement of the thyroid (*goiter*), and the forward displacement of the eyeballs (*exophthalmos*). It often happens that the disease is not recognized before it reaches this point. A feeling of internal heat and immoderate perspiration now set in; the sleep is interfered with; and the appetite soon becomes poor. The patients usually become very thin, and a number of nervous and mental symptoms appear. The subjects are irritable, their memory is poor, and this condition may even go on to melancholia and insanity. There is almost invariably rapid and irregular heart-action. The most marked sign, which is evident to the unpractised eye, is the protrusion of the eyeballs, so that the white of the eye seems very large (Plate XVIII. Fig. 1). The disease develops slowly and has a very chronic course, periods of improvement alternating with aggravated conditions. The sense of internal heat prompts the patients to don very light clothing; they prefer to keep cool, and like to sit at the open window.

In the treatment of this condition, the patients must be protected from harmful influences, and should avoid all mental excitement. In most cases this advice can be followed only with difficulty. A life in the country, particularly in the mountains, is to be recommended; or else a term of treatment in the proper kind of sanitarium. Care must be taken not to subject the patient to too many "cures." Among the remedial measures may be mentioned mild hydrotherapeutics, cool baths, half baths, the application of electricity to the neck, and simple but nourishing food, consisting mainly of milk and vegetables. In addition to these, medical treatment is necessary. The use of the thymus gland (not the thyroid) of the sheep has been credited with success; but the more modern treatment with specially prepared blood-serums from animals will probably be attended with a better outcome. In severe cases, where the goiter is very large, surgical interference, by which the gland is diminished in size, may be considered necessary; but this should not be resorted to until all other methods of treatment have failed. It should be borne in mind that worry about the condition is one of the most frequent causes of the rapid, irregular heart-action. If patients suffering from this disease would resolutely still their fears concerning themselves, they would aid the physician very materially

in the treatment (see Dubois, *The Psychic Treatment of Nervous Disorders*, New York, 1905; pp. 13, 25, 306).

EXPECTORATION.—See SPUTUM.

EYE.—For structure see THE ORGANS OF SPECIAL SENSE, in INTRODUCTORY CHAPTERS (pp. 68-70).

EYE, CARE OF.—The eye is one of the most sensitive nerve-organs of the body. Its systematic care must therefore be counted among the most important hygienic necessities, and it is to the individual interest of every one to consider this a duty. What may be said in a general way of the care of the normal eye, may be applied with more insistence to the diseased eye.

As soon as the child is born, the eyes must be carefully inspected, and cleaned with fresh, clean, absorbent cotton and lukewarm, previously boiled, water. To prevent the dangerous inflammations of the eyes of the new-born, the physician or midwife may drop a few drops of a solution of nitrate of silver into each eye (Credé's method). If, in spite of these precautions, inflammation sets in, no time should be lost in summoning a physician, as a large number of cases of blindness can be traced to this condition. Although the eyes of the new-born baby should be shaded from too strong a light, this does not mean that all light and air should be excluded.

In young children, sometimes even at a tender age, inflammations of the conjunctiva and the cornea appear, in connection with eruptions on the face and head and enlargement of the glands. These are usually of a scrofulous nature, wherefore not only the eyes should be treated locally, but general medical treatment should be instituted, including the administration of tonics, appropriate diet, cod-liver oil, fresh air, etc. In various diseases of children (as scarlet fever, chicken-pox, and measles), the eyes also become inflamed; but these cases do not require any special treatment, it being usually sufficient to darken the room, without, however, cutting off the supply of fresh air. When the child becomes old enough to work and play out-of-doors, all work which puts a strain on the eyes should be avoided. In buying picture-books, preference should be given to those with large and plain pictures, which do not require too much attention to little details.

The entrance into school constitutes the most dangerous period for the child's eyes. It behooves the physician, the parents, and the school authorities to unite in their efforts to prevent the occurrence of near-sightedness, a school-disease in the true sense of the word. School-rooms must be high and provided with large windows, arranged in such a manner that the light is distributed uniformly and sufficiently. A very bright light must be subdued by proper shades. The hours of work should be alternated with regular periods of rest. The school-benches must be so constructed that they do not make it necessary for the child to lean forward or to one side in order to reach his desk. The pupil should sit straight in front of

the desk when writing. The type used in books should be sufficiently large and plain, and liberal spaces should separate the individual letters, words, and lines. Proper attention to these details should also be insisted upon in the home. The erect position may be favored by proper work-benches or desks, which should fulfil the following requirements (see Figs. 133, 134):

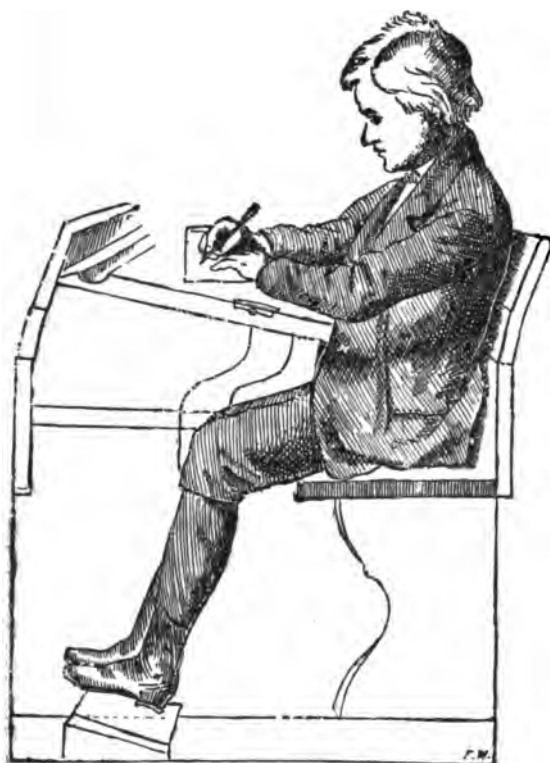


FIG. 133. Correct attitude when writing.

(1) They must be so constructed as to allow the feet of the pupil to rest comfortably on the floor; (2) a space of several finger-breadths must intervene between the hollow of the back of the knee and the edge of the bench; (3) the seat on which the child sits must project inward beyond the edge of his desk; (4) the desk or table should be at such a distance above the bench, that the child can rest his arms comfortably upon it while sitting upright; (5) the table should be neither too high nor too low. The window, or whatever artificial source of light is used, should be on the left hand of the desk or work-bench, in order that the shadow of

the hand may not fall on the writing-surface. Artificial light, a necessary evil, must be uniform and steady; a flickering or glaring light should not be used. If necessary, the eyes may be protected from the direct rays of the light by a green shade, or better, by attaching a suitable globe to the lamp or gas-burner.

Alternating periods of rest and work must be insisted upon also at home, and the eager reading of story books and novels, usually very poorly printed, should be forbidden. The reading of music notes, and the production of fine needlework are exceedingly harmful for the eyes of a child. If, in spite of all these precautions, a visual weakness is suspected by the way in which the work is brought up close to the eyes, or by a lack of endurance, no time should be lost in providing for a careful examination by the physician. If deemed necessary, spectacles may be prescribed, so that the child may not be backward in school because of visual defects which can be remedied.

A child who complains of a twitching of the eyeball, generally suffers from a congenital weakness, and allowances must be made for children thus affected.

The beneficial effects which outdoor exercise, gymnastics, swimming, and other sports exert on the organism, are of course extended also to the organ of sight. But at the very beginning it is essential that any overindulgence in such sports be carefully avoided. Diving after objects is harm-



FIG. 134. Incorrect attitude when writing.

ful because inflammatory disturbances may arise from keeping the eyes open under water for a prolonged time.

The play of children should be under the supervision of either teachers or parents. Knives and other cutting instruments should not be permitted, and this restriction should be extended to weapons of all kinds, including the apparently harmless pop-guns and pea-shooters. Especial attention is here directed to the toy pistol; the explosion of the caps which are used in it often cause severe and incurable injuries to the eyes.

The choice of an occupation should largely depend upon the condition of sight, and it is advisable to have this ascertained by a medical examination. Where there is present a tendency to near-sightedness, no occupation should be chosen which requires distant vision as an essential. Those

afflicted with far-sightedness will, on the other hand, find it extremely inconvenient to follow a calling which requires the continued application of their sight to objects near at hand. If repeated inflammatory disturbances have brought about an irritable condition of the eyes, occupations must be avoided which necessitate exposure to external irritation, such as dust, smoke, strong light, or heat. The army, the navy, and the railroads have established certain minimal visual requirements which must be fulfilled by applicants for positions in their service.

The care of the eyes should not be neglected even by adults, who should always endeavor to alternate periods of work with rest, especially when doing work near at hand. When the time has arrived, usually about the forty-fifth year, when near vision becomes somewhat impaired, the individual should not hesitate to wear proper glasses in order to assist the eyes, instead of giving way to the popular delusion that such a course weakens the visual organs. The choice of glasses should not be left to the optician. Although apparently simple, this is a difficult task which requires exact study of each individual case, and the application of specialized medical knowledge. Reading while in the recumbent posture strains the eyes, and sewing at dusk or with insufficient light is also harmful and should be avoided. As a general rule it is well to avoid sudden changes of light and darkness, as well as a glaring light. The latter may be lessened by protective spectacles or by white window-curtains. If the artificial light is too strong, some form of lamp-shade, or the protective eye-shade already referred to, should be employed. The blinding which results from gazing into an open fire or into the sun is likewise harmful, and such exposure ought to be avoided. For the same reason, smoked glasses should be worn to overcome the blinding effects of sunlight on the snow, or when sojourning at the seashore. These glasses not only serve to protect weak, irritable eyes, but are of service also in protecting normal eyes which are exposed to various external irritants, such as bad air, and the entrance of foreign bodies. In case the latter accident has taken place, medical aid should be summoned. This applies particularly to cases where caustic substances, acids or alkalies, have penetrated the eye. Among foreign bodies must also be included the larvæ of certain animals, which have entered the organism in contaminated food, and have then been taken up by the circulation and settled in the interior of the eye. Fortunately such cases are extremely rare. They constitute a serious condition, and can be eliminated only by operative procedures.

The effects of various poisons may be very deleterious to the eye. The excessive use of stimulants, such as alcohol and tobacco, may cause symptoms of visual disturbances; and poisons which enter the system in consequence of the individual's occupation may likewise cause great harm. The latter condition is found among workers in bisulphid of carbon, many dyes,

lead, etc. The best, and in fact the only efficient, treatment consists in the removal of the offending toxic material, and, where indicated, a change of occupation.

The indiscriminate use of the various eye-washes commonly exploited calls for particular warning. They are either useless or harmful. Very often they are the means of postponing a timely consultation with the proper medical adviser. There are no drugs or salves which can strengthen the eyes. The treatment of such a delicate organ by household remedies, secret concoctions, or by a quack, usually meets with the reward which it deserves. Self-treatment with milk, raw meat, frog's spawn, freshly passed urine, etc., can only be productive of harm to a diseased eye. But caution must not be limited to such disagreeable and disgusting remedies; it must be extended also to apparently harmless remedies, including cold applications of water, camomile, and lead-water. In any given case the choice of the remedy should be left to the discretion of the physician, who also will decide whether cold, warm, or hot applications are to be employed. It is well to remember that in every case of disturbance which involves the eyes, the physician's counsel had best be sought, for in no other organ of the body is it more difficult to compensate for the sins of omission.

EYE, DISEASES OF.—The various diseases affecting the organ of sight may be conveniently discussed as external and internal, or those which affect the outer parts of the eye—the conjunctiva and the cornea; and those which have their seats in the interior of the eye—the choroid, the crystalline lens, the various media, the retina, and the optic nerve. These diseases are here discussed under their several headings.

Conjunctivitis.—An inflammation of the conjunctiva, or the mucous membrane of the eyelid, and that portion of the mucous membrane of the eyeball which is united with the eyelid. It may be a simple catarrhal process—catarrhal conjunctivitis; a granular process—trachoma; or a purulent process—suppurative conjunctivitis or blennorrhœa.

Catarrhal Conjunctivitis is an extraordinarily frequent disease, met with in the larger cities. It is for the most part comparatively harmless, although not always so. As a rule it is due to external irritants, such as dust, smoke, and bad air, and manifests itself as a reddening of the eyelids, the profuse flow of tears, a burning pain, and some irritability of the eyes. Very often, on awakening in the morning, both lids will be found glued together, especially at the inner angle. In children, the inner surfaces of the lids often become the seats of small blisters as large as the head of a pin. The disease may not be the cause of any definite symptoms, and is sometimes discovered only by accident.

Very often the condition may continue for years, and in obstinate cases it may resist every form of treatment. As a rule, however, the disease subsides under appropriate therapeutic measures. All secret remedies and

eye-washes should be zealously avoided, as they are liable to do great harm. It is better to resort to timely medical advice. Ordinarily the introduction of eye-drops prescribed by the doctor, together with cooling applications,



FIGS. 135 and 136. Protection glasses.

are sufficient. In obstinate cases it may be necessary to resort to mild cauterization of the mucous membranes of the eye. Sometimes the disease may be traced to some visual defect, such as near- or far-sightedness, or to an irregular curvature of the cornea. In such cases the wearing of suitable glasses will cause the trouble to disappear. Persons whose occupation exposes their eyes to continual irritation should wear a pair of protecting glasses (see Figs. 135, 136), and in some instances the abstention from smoking and drinking also has a very beneficial effect.

Granular Conjunctivitis is a contagious disease which runs a chronic course with occasional exacerbations. It appears as a violent inflammation of the mucous membranes of the eye, which become covered with numerous, oval, transparent nodules (see Plate XII. Fig. 4). The severity of the disease depends in the first place upon its chronic course, and secondly upon the complications and sequelæ. When the disease has been present for some time, cloudiness and ulceration of the cornea may develop, resulting in the more or less complete loss of sight. This may be accompanied also by a scar-like contraction of the connective tissue of the lids, adhesion between the latter and the eyeball, and inversion of the eyelids and the eyelashes. During its entire course the disease is marked by the discharge of more or less mucus and pus, by pain, and by a morbid intolerance of light (*photophobia*). The severity of these symptoms depends upon the extent to which the cornea has been involved.

This form of conjunctivitis is usually met with among the unclean, poorly domiciled lower classes; and is found also in institutions, where its spread is favored by the use in common of towels and other objects. Certain localities (such as Arabia and Egypt) are especially afflicted; and in eastern Europe (Russia, Poland, Hungary) the disease is more prevalent than in the western part of the continent. In low countries (as Holland and Belgium) the disease is of more frequent occurrence than in mountainous countries like Switzerland. The disease, which has been endemic in Europe from the earliest times, became epidemic in that continent after

the return of Napoleon I. from his Egyptian campaign. At that time hundreds of thousands were afflicted; but since then the virulence has declined, although it is to be noted that lately it has again extended itself in Prussia. The disease is being brought to the United States through the great arteries of immigration, although attempts—more or less successful—are being made to prevent its entrance.

The main essentials for patients suffering from granular conjunctivitis are cleanliness, fresh air, and clean clothes. In order to prevent the infection of others, patients should have their own toilet-articles, particularly towels. At the earliest symptoms of infection, cooling applications and lotions are indicated, which may be followed later by cauterization of the conjunctiva with nitrate of silver or sulfate of copper. In obstinate cases it may be found necessary to resort to an operation by which the nodules should be removed as rapidly and completely as possible. The troublesome inversion of the lids can likewise be corrected only by operative means.

Purulent Conjunctivitis is an acute conjunctivitis with the formation of serum, fibrin, and pus. It is most frequent in the new-born. A suppurative inflammation of the mucous membrane of the eye in the new-born infant results from an infection by secretions which are present in the genital passages of the mother, and it can usually be proved that the latter had been afflicted with a gonorrheal discharge. The conjunctivitis begins, two or three days after birth, with a profuse, thick, yellow, purulent discharge, and a swelling of the mucous membrane of the eyelids. For preventing the disease, the method devised by Credé is now almost universally employed (see EYE, CARE OF). If a purulent discharge is observed even after the use of this treatment, medical aid should at once be sought. Very often it is possible to save the eye, although it may require weeks of earnest and devoted attention. The condition must be looked upon as an extremely dangerous one, and any prediction regarding its course must be made with caution. In very severe cases the process may go on to ulceration of the cornea and complete loss of sight. About ten per cent. of all cases of blindness due to inflammation are usually found to have occurred in children who were not given the benefit of medical treatment, or who received such treatment at a late stage of the disease.

In adults the disease may be caused by accidental inoculation or by lack of cleanliness, where a gonorrheal discharge from the urethra is present. As a general rule, the course of the disease in adults is even more virulent than in new-born infants. The disease manifests itself, within twelve hours after infection, by the excretion of a profuse purulent discharge, which is at first watery and later creamy, and also by an intense swelling of the lining mucous membranes. Here, as in the infantile type, the danger lies in the formation of corneal ulcers, and the prognosis depends upon the amount of swelling of the conjunctiva and upon the time at which the

patient comes under treatment. If no complications occur, the disease lasts about three weeks in children, and six in adults. It is advisable for adult patients to go to a hospital or sanitarium if possible, on account of the numerous chances which they offer of infecting their surroundings. The affected eye must be irrigated every hour or even every few minutes, day and night, a task which had best be assigned to a skilled nurse. The eyelids are separated with the second and third fingers of the left hand; as much of the secretion as possible is removed by gentle manipulations toward the inner angle of the eye; and irrigation is done with a wad of



FIG. 137. Watch-glass held in place by adhesive plaster, to protect the eye.

cotton saturated with the prescribed solution or with boiled water, and held between the fingers of the right hand. The cotton swabs should be burned immediately after use.

The healthy eye should be covered with a contrivance consisting of a watch-glass held in place by adhesive plaster (see Fig. 137) in order to protect it from the purulent infectious secretion. Ice poultices, kept on continuously day and night, are very efficacious, but they must never be placed directly on the lids, a protecting compress made of several folds of a thin handkerchief being interposed between them. The necessary medicinal treatment can be undertaken only by the physician or by a specialist. Every patient afflicted with a gonorrheal discharge should be cautioned to practise extreme cleanliness, and should be informed of the dangers attendant upon infection of the eyes.

Diseases of the Cornea.—Acute affections of the cornea are always accompanied with marked redness of the eyes, with pains, photophobia, and

secretion of tears. A characteristic sign of an inflammation of the cornea is the appearance of a sharply defined or more extended cloudiness of this otherwise transparent membrane. The otherwise reflecting surface of the cornea becomes opaque and uneven, or smooth, according to whether the affection is situated in its more superficial layers, or in its deeper ones.

Superficial Inflammation of the Cornea is a very frequent disease in small children; generally as a symptom of scrofula. It shows a great tendency to recurrence. On healing, more or less dense scars (*corneal opacities*) are left, which may give rise to considerable disturbance of vision, especially when they are situated in the center of the cornea. If the affection persists for some time, ulceration may ensue; and in particularly obstinate cases this may lead to perforation of the cornea, escape of the aqueous humor, and prolapse of the iris. Ulcers of the cornea may arise also after superficial injuries; frequently they spread very rapidly (especially when occurring simultaneously with an affection of the lacrimal sac), and they heal but slowly and with the formation of dense scars.

Deep-seated Inflammation of the Cornea (Keratitis) is an affection which runs a very protracted course. As a rule both eyes are involved simultaneously; sometimes one following the other after a longer or shorter interval. In most instances inherited syphilis is the cause of the disease, although it may arise also from a neglected chronic catarrhal conjunctivitis. The younger the patient, the more favorable, as a rule, is the course of the affection. Deep-seated opacities usually persist.

Purulent Inflammation of the Cornea occurs most frequently as a result of injuries. If the pus accumulates in the anterior chamber of the eye, it will in most cases be found necessary to remove it by an operation.

Injuries and Wounds of the Cornea, which may be caused by the entrance of foreign bodies or by violence, etc., should always receive the immediate care of a physician in order that grave complications may be avoided. The same applies to erosions by chemicals, etc.

Buphthalmia or *Ox-Eye* is a congenital affection of the cornea (see Plate XII. Fig. 2) which is characterized by an excessive collection of aqueous humor, causing all parts of the eyeball to bulge. The cornea is sometimes clear, but as a rule slightly opaque. Blindness is certain to follow, if operation, which consists in the excision of part of the iris, is delayed.

Treatment of affections of the cornea should always be left to an ophthalmologist, owing to the diversity of the symptoms. In general it may be said that hot compresses are better borne than cold ones. Warning should be given against the indiscriminate application of eye-waters, as well as against the inappropriate massage of the eye by which many quacks have caused blindness in cases in which it would otherwise have been possible to save the eye.

Choroiditis.—Inflammation of the choroid coat of the eyeball; a disease which may occur at any time of life. Beginning as an inflammation without pain or outward evidences of its presence, it leads gradually to an impairment of vision, due to the involvement of the retina and the vitreous body. The patients notice that they see badly when the evening twilight comes on, that there are blanks in the visual field, and that objects appear distorted. There are also various light disturbances, such as flickering before the eyes, sparks, points of fire, etc. This disease, which can be recognized only by aid of the optical mirror (ophthalmoscope), pursues a very insidious course. As it progresses, complete blindness may result. The principal causes are syphilis and tuberculosis, and, aside from these, general nutritive disturbances, anemia, scrofula, etc. The best results from treatment are obtained in the syphilitic cases.

Inflammation of the Iris.—A comparatively severe affection which usually occurs in consequence of a general disease, most frequently of syphilis. It may occur also as a part symptom of diabetes mellitus, gonorrhea, or rheumatism. The disease manifests itself by redness of the eye, by dread of light, and by violent pains radiating into the forehead. Medical treatment is necessary without delay, as otherwise adhesions and other disturbing conditions develop which may give rise to considerable impairment of sight, or even to GLAUCOMA and consequent loss of vision. The physician will treat the local condition as well as the general health, thus guarding against recurrences. Resting the eyes is an essential requirement, and it is advisable to wear dark-colored glasses.

Diseases of the Retina.—Affections of the inner coat of the eye, like those of the optic nerve, are recognizable only by means of the ophthalmoscope. As a rule they are painless, except when the disturbance has reached an advanced stage.

Inflammation of the Retina usually manifests itself in a bloodshot condition of this membrane, and is almost invariably a sign of some general disease, such as syphilis, inflammation of the kidneys, diabetes, heart-disease, or arteriosclerosis. Anything that improves the general health will usually help the eyes at the same time. Chronic inflammations lead to irrecoverable blindness.

Separation of the Retina is usually the outcome of a very intense form of near-sightedness, and is always a serious matter, even though it is sometimes possible to prevent it from causing blindness. It may arise also from a tumor of the inner eye, and in such cases it is necessary to remove the affected eye immediately, on account of its menace to life.

A deposit of pigment in the retina may occur as a symptom of hereditary syphilis, or as a consequence of blood-relationship in parents, and occasionally without any determinable cause. These troubles lead slowly but surely to blindness.

Diseases of the Optic Nerve.—Injury or disease of the optic nerve results in acute or gradual blindness. Sudden hemorrhage into the retina, and acute poisoning from wood-alcohol, lead, quinin, and other substances, result in transitory or in permanent blindness. The pressure of a tumor within the brain affects the optic nerve, and if the pressure continues for any great length of time it usually induces blindness. Gradually increasing blindness may be due to a number of other causes, all of which require expert diagnosis.

See also the articles AMAUROSIS; AMBLYOPIA; BLINDNESS; GLAUCOMA; HEMERALOPIA; NYCTALOPIA; SCOTOMA; SIGHT, DISTURBANCES OF; SQUINTING.

EYE, INJURIES TO.—Lesions resulting from external violence to the organ of sight must always be considered very serious. They demand immediate medical attention, and preferably that of a specialist. Even slight outward evidences of injury, such as discoloration of the eyeball by blood, may mean laceration of the membranes in the interior of the eye and hemorrhage into the vitreous body. An important point in the prognosis depends on whether or not the injury has resulted in opening the eyeball and establishing a communication between the interior of the eye and the external air. Where this has not occurred, as in contusions and concussions, healing takes place rapidly; whereas in the other case there is usually loss of sight and destruction of the entire eye. The severe character of such an injury is due to the fact that objects which penetrate the eye are usually unclean, and thus bring about suppuration. The contraction of the eyeball results in gradual loss of vision. Moreover, it often happens that the surgeon is compelled to enucleate the affected organ when it is found impossible to check the inflammation, and prevent it from involving the healthy eye.

The treatment of injuries to the eye should usually be left entirely to the physician, and while waiting for his arrival the eye should merely be covered with a clean handkerchief. Simple contusions may be treated by the application of cold compresses. Where the injury is due to the entrance of chlorid of lime, as many of the particles as possible should be removed by irrigation with water, milk, or oil, and also by gently wiping out the conjunctival sac. Foreign bodies, such as bits of coal and steel, are usually to be found on the inner surface of one of the lids, more frequently the upper, or they are embedded in the cornea. The patient will but rarely succeed in removing them by stroking the eye in a direction from the temple toward the nose, or by wiping the cornea with the lid everted. If the rubbing is done too forcibly, the foreign body becomes embedded more firmly in the eye, the irritation increases, and the pain grows more severe. In such a case it is better to protect the eye with a clean cloth and allow the offending body to be removed by a physician. The manner in which the upper

lid may be everted for the purpose of exposing the foreign body, is shown in Plate XII. Fig. 1. Even after the removal of the foreign object the sensation caused by its presence persists for a time. Steel splinters which have become lodged in the vitreous body, or in other deep parts of the eye, must be extracted with a magnet devised for this purpose.

EYE, INSTILLATIONS INTO.—Eye-drops may be instilled into the eye by aid of a glass rod, or better with an eye-dropper. The latter consists of a glass tube pointed at one end, and furnished with a rubber bulb at

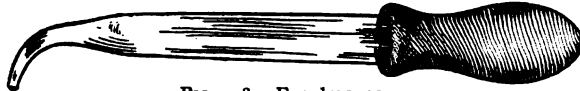


FIG. 138. Eye-dropper.

the other (see Fig. 138). A contrivance of this kind is fitted into the stopper of the bottle which contains the medicine to be used. The eye-dropper is filled by squeezing the rubber bulb between the fingers, then dipping the end of the tube into the prescribed fluid, and releasing the pressure of the fingers. The dropper is then held over the inner angle of the eye, and by pressing the two fingers together on the rubber bulb a few drops are instilled into the eye which is held open with the thumb and index-finger of the other hand. This distributes the fluid over the interior of the eye, and the burning sensation ordinarily disappears within a few minutes. The instillation may be followed by the application of a cold compress for a time. If the excretion from the eye is very profuse, it is necessary to clean the eye by irrigations and thorough drying before the drops are instilled.

EYELASHES, AFFECTIONS OF.—Eyelashes are fine, small hairs, dark or light in color, which grow in two or three rows along the edge of the eyelid. They belong to the protective organs of the eye, serving to guard it from dust, from the entrance of foreign bodies, and particularly (like the eyebrows) from the drops of perspiration which run down from the forehead. The roots of the eyelashes frequently become the seat of an inflammation which, if neglected, will cause the hairs to fall out. This not only mars a person's appearance, but leaves the eyes without lashes, which makes them irritable and sensitive to the light. When the eyelids turn inward on account of inflammation, the lashes rub against the sensitive cornea and cause severe chafing every time the eyelids close. Eyelashes may grow in a wrong direction even when there is no inflammatory condition of the lids. When this is the case they must be pulled out, and if they continue to grow they can be eradicated by electricity.

EYELIDS, BLINKING OF.—The purpose of blinking is to distribute over the surface of the eye the moisture which is derived from the conjunctiva and the tear-glands, and thus to prevent the cornea from becoming dry. Whenever the eye is irritated, this blinking is increased. In children this is often attributed to bad habits, but it is more apt to be due to some

catarrhal condition of the conjunctiva or to a deviation from normal vision, either near-sightedness or far-sightedness. In severe cases a muscular spasm of the lids may actually be present, and this is often a very obstinate condition, which improves only after prolonged treatment with electricity, or after stretching and exercise of the affected muscles.

EYELIDS, DISEASES OF.—The eyelids may be affected with diseases similar to those which involve other parts of the skin; for instance eruptions, erysipelas, formation of blisters, suppurations, furuncles, carbuncles, various forms of benign and malignant ulcers, warts, encysted tumors, dilatations of vessels, etc. Dark-yellowish spots of various sizes are very frequent. These affections are all treated according to the usual principles.

Swelling of the eyelids is always a symptom of disease, possibly of supuration of the eyelid, of a sty, of an affection of the lacrimal sac, of deep-seated disorders of the eyes, or of a disease of the kidneys. Extravasations of blood into the lids occur after injuries to the eyelids or to more remote parts; for instance, after a fracture of the skull or of a wall of the orbit.

The borders of the eyelids are also the seat of frequent affections and inflammations. Scales, small ulcers, and crusts may develop here, causing the lashes to become matted. If these conditions persist for some length of time, the skin of the eyelids becomes affected, and scar-tissue develops which turns the borders of the lids inside out. This causes a condition known as *blear-eye*, which is as unsightly as it is annoying. A sty generally develops on the border of the lid, whereas an internal sty represents a slowly growing tumor located in the lid itself.

Eversion of the eyelid (*blear-eye*) occurs also in inflammation of the lids, and likewise as a consequence of scar-forming injuries to the skin of the lids; it may appear also as a symptom of old age. *Inversion* of the eyelids takes place in various inflammatory affections of the eye, especially in granular lids, or trachoma. This condition is aggravated by the friction of the inverted lashes upon the cornea. See EYELASHES, AFFECTIONS OF.

Imperfect closure of the eyelids (*hare's eye*) is due to shortening of the lids owing to chronic inflammation, to paralysis of the nerve which supplies the lid-closing muscle, to exophthalmic goiter, or to protrusion of the eyeballs as a result of tumor formation. When very marked, this condition is dangerous because the cornea, which is not covered by the lid during sleep, is liable to become dry and ulcerated. Like all the other changes in the position of the eyelids, this condition can be cured only by operation.

Drooping of the eyelids is very rarely congenital, but is most frequently the result of injuries, tumors of the lids, inflammations, or paralyse of nerves.

Spasms of the lids occur either as twitchings (winking), or very often as convulsive closing of the lids in scrofulous eye-affections of children. The operative widening of the opening between the lids, an absolutely harmless operation, often gives surprisingly good results.

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FACE, DISEASES OF.—A number of affections may be localized in the facial region. These may involve the sensory nerves, giving rise to pain, facial neuralgias, etc., chief of which are those due to defective teeth; or they may involve the facial motor nerves, causing facial spasms (tics), or facial paralysis (Bell's Palsy), or wasting of the muscles of the face. The nerves chiefly involved are the fifth, causing sensory symptoms, and the seventh, affections of which cause the motor symptoms, the paralyses. The spasms, or tics, are probably of cerebral origin.

Atrophy of the Face.—A rare affection which is characterized by a wasting of one side of the face. It is due to a severe injury to the nerve, and manifests itself by a slow and gradual wasting, first of the skin, then of the fatty tissue, and finally of the bone. This causes the affected half of the face to fall in (see Plate XVIII., 4). The disease occurs most frequently during youth and in the female sex. A retrogression of the symptoms is very rare. Apart from a slight inconvenience in chewing, there is little to disturb the patient's health. The progress of the disease ceases, as a rule, when it has reached a certain development, and thus the distortion of the face does not go on indefinitely. The lesion is usually in the medullary centers.

Pains of the Face.—These occur frequently in the region of the trigeminal nerve as the result of injuries, exposure to cold, or bodily disease (such as typhoid, influenza, or gout). Affections of the nose, ear, and particularly of the teeth may also be factors. The nerve-branches most frequently affected are the superior and inferior orbital nerves—causing headaches in the regions of the forehead and eye, and those nerves which supply the region of the lower jaw—causing toothache. The most severe form, which is especially designated as "tic-douloureux," is the excruciating, twitching pain which appears in lightning-like flashes in two or three places, mostly confined to one half of the head. At the onset of this latter affection it is possible to effect a cure by systematic stretching of the skin and muscles, and by other methods to be determined upon by the physician. Severe and chronic cases must be treated by surgical measures, injections of osmic acid, nerve cutting, or by destruction or removal of the Gasserian ganglion.

Patients suffering from facial pains should consult their physician as to the treatment, and should beware of the numerous, greatly extolled "head-ache" and "pain-killing" remedies, such as antipyrin, acetanilid, phenacetin, orangein, migrainin, etc.; and they should especially avoid the use of opium in any form.

Paralysis of the Face.—This condition is brought about by injury to the seventh, or facial nerve, which controls the movement of various facial

muscles, such as those of the forehead, eyelids, cheeks, lips, and chin. If the nerve be disordered or destroyed, the result will be partial or complete paralysis of that half of the face which is supplied by the affected nerve. As a rule the affection is not painful. In case of a complete paralysis of one side of the face, the patient presents the following appearance (see Plate XVIII., 2): One side of the face appears distorted, and strange to say the abnormality seems to the non-medical mind to be situated in the well side of the face and not in the affected part. When speaking, the patient moves only the healthy half of the face, the paralyzed side remaining flaccid, rigid, or quiet. The normal facial wrinkles and folds show on the unaffected part of the face, but have disappeared on the diseased part. The corner of the mouth droops, and owing to the paralysis of the muscles of the lips and cheek the patient is unable to pucker his lips, to whistle, and to knit his brows. It often happens that he is unable to close the eye of the affected side, and that he bites the mucous membrane of the cheek when he eats.

The cause of the paralysis is either an internal one (an apoplectic stroke), in which case other parts of the body may be involved; or it is an external one, such as exposure to constant draft, or injury to the nerve itself. The patient may, for instance, have exposed one side of his face to a draft of cold air by sitting for hours in a railroad train by an open window. Facial paralysis following an apoplectic stroke is usually very persistent. Serious damage to the brain-tissue has occurred, and is not readily overcome. Only in the most favorable cases is it possible to achieve a certain degree of improvement in the course of time and with proper treatment. Paralysis due to involvement of the nerve itself, as those following exposure to cold, run a more favorable course. The mildest forms of paralysis of this nature may be cured in a few weeks or months under proper medical treatment; in the severer cases it takes several months to effect a cure. In those rare instances where the cause is other than a simple exposure to cold, it may be impossible to effect recovery. The paralyzes due to diseases of the ear are frequently of this nature.

The treatment for paralyzes due to internal causes includes the application of electricity to the affected part, massage, sweating-baths, and packs. Where an apoplectic stroke is the cause, the treatment consists in regulation of the mode of living, rest, and internal medicines; recent cases may be benefited by the application of ice or cold compresses to the head, and by bloodletting. Rubbing the affected half of the face with alcohol stimulates the skin and promotes the circulation of the blood. The much-vaunted, so-called "apoplectic waters" are humbugs. The sufferer should learn to acquire patience.

Spasm of the Face.—In the faces of many persons, especially under the eyes, there is often observed a rapid, periodical twitching of the muscles.

The affection is designated as a convulsive tic. It may involve also other muscles, sometimes causing peculiar facial grimaces. It is not a painful affliction, but is disturbing and inconvenient. These spasms may occur on one or both sides of the face, and are caused by affections of either the jaws, the eyes, or the ears. Painful diseases of the teeth, paroxysmal pains of the face, as well as a number of nervous diseases, such as hysteria, and St. Vitus's dance, may give rise to the "making of faces." A frequent form of facial spasm is "winking" of the eyes.

Electricity, almost the only remedy employed in the treatment of this disorder, does not give as certain and rapid relief as repeated stretching and massage of the affected muscles. Pure nervousness or fatigue may be the cause of many of these tics, and in such cases rest and food are frequently sufficient to bring about relief. The movements are often self-induced, and these are among the most difficult to cure. The patients get into a bad "habit," and the convulsive movements, at first voluntary and readily controllable, gradually become almost beyond the control of the patient.

FAINTING.—A sudden slight loss of consciousness brought about by a diminution of the amount of blood supplied to the brain. It is of frequent occurrence, and may be occasioned by violent pain, marked psychic emotions, bodily overexertions, great losses of blood, or even by staying for some time in an overcrowded room. It is characterized by dizziness, ringing of the ears, inability to recognize surrounding objects (which appear to revolve), cold perspiration, deathly pallor of the face and lips, and sudden collapse. The limbs are fully relaxed, respiration is scarcely noticeable, and the pulse can hardly be felt. Sometimes this condition may pass off in a few seconds, but in other cases it may persist for several minutes.



FIG. 139. Method of supporting a fainting person.

To treat such attacks, the patient's head should be lowered, all constricting garments loosened, and cold water dashed upon his face and chest. Smelling-salts or cologne are useful as stimulants applied to the nostrils, but it is still better to leave the patient alone with plenty of fresh air and

resting comfortably with the head on a pillow. As soon as the patient is able to swallow, coffee, tea, or a mild alcoholic stimulant may be administered. The method of leading a person who is in a fainting condition is illustrated in Fig. 139.

FALLOPIAN TUBES, DISEASES OF.—See OVARIAN TUBES.

FANGO.—A volcanic mud of clay-like appearance, found in northern Italy. It is used for packs and poultices. The patient is placed upon a



FIG. 140. Application of fango.

woolen blanket spread over a waterproof sheet, and the mud, which has been heated to 104 F., is spread upon the affected parts of the body in a layer of about half an inch in thickness (see Fig. 140). The rest of the body is either covered lightly or, if the general effect is to be intensified, is wrapped in several blankets so that the patient perspires freely. The duration of a fango-pack varies from 30 minutes to one and one-half hours. Upon the removal of the mud, the patient is placed in a lukewarm bath for about five minutes, and finally treated with a cool shower-bath. He then rests for some time upon a couch.

It is obvious that the mud of itself has no physiological action, but it supplies a uniform, moist heat which is retained for a long time. The method, therefore, is merely a substitute for the old-fashioned linseed and water poultices, steam compresses, hot poultices of mud, sand-baths, etc. It is employed in the treatment of persistent joint-affections, in gout, articular and muscular rheumatism, and for neuralgias in general.

FAR-SIGHTEDNESS (PRESBYOPIA).—See SIGHT, DISTURBANCES OF.

FAVUS.—A parasitic disease of the skin, affecting chiefly the hairy parts of the scalp, and being due to a fungoid growth. It is characterized by the appearance of flat, yellowish crusts which adhere tightly to the skin, each of them being transfixed by a hair. After the disease has existed for a time, considerable areas may be covered by a thick, scaling crust; but the scalp is never entirely involved, and that portion which includes the temples and the occipital region may remain altogether free. The hair loses its gloss, and appears as if covered with a fine dust. Patients afflicted with this disease give rise to an odor resembling that of mice. After a time the scales fall off and with them the affected hairs, leaving smooth, white, hairless scars. A spontaneous cure may result in from twenty to thirty years, because by that time all the diseased hairs have disappeared, and the fungus can develop only along a hair or its sac. Transmission can take place from one human being to another, or the disease may be derived from dogs, cats, rabbits, mice, rats, or poultry. Treatment consists in the removal of the scales with soap and water, disinfection of the diseased area with salves, and pulling out the affected hairs. Medical aid and direction is necessary.

FEAR.—In many cases of illness there are present certain very annoying conditions of fear and apprehension. They are often due to insufficient nourishment of the brain, and are seen in a marked degree in melancholia, insanity, and other mental disturbances, and also in cases of cerebral poisoning by alcohol or tobacco. The state of fear associated with high fever also belongs in this category, and is partly due to toxic materials circulating in the blood. A fear of death, accompanied by a cold, clammy perspiration, is often observed in the advent of sudden cardiac failure, as from internal hemorrhage, as long as consciousness remains. In the presence of cardiac disease or calcification of the coronary arteries, attacks of fear often occur, combined with a feeling of impending death; but these are usually transitory.

A distinct train of symptoms is furnished by the frequent attacks of fear in neurasthenics. This comes on after severe exertion, mental excitement, the use of stimulants, sexual excesses, etc. Very often a hereditary predisposition is present. In these neurasthenic attacks, the patient's heart begins to beat very rapidly, and he is seized with a sudden intense fear; under certain conditions he may be prompted to do the most ridiculous things. The attacks may be induced by a variety of circumstances; for example, by being seized with vertigo in an elevated locality, such as a mountain, a tower, a bridge, or even at an open window. A state of fear may also be generated in such persons when they are compelled to walk across a large square or along a long row of houses; and under this category may also be classed those cases of fear which are occasioned by staying in

a closed room, in a church or theater, in the presence of other persons, or before an audience (the "stage fright" of actors, lawyers, and preachers).

The morbid fear of contracting every serious form of disease is usually due to improper reading or conversation. Another form of phobia is that of becoming soiled by contact with persons and ordinary objects. Such persons refuse to shake hands, permit no one to come into their rooms or dwellings, keep by themselves, and wash their hands many times daily. These morbid thoughts also take on a religious aspect, and afflicted individuals are made to believe that the contact or even the glance of another person will contaminate their souls and render them sinful. A condition of this kind is exemplified by the ascetics, and other religious bodies of the middle ages, who in the light of present-day knowledge must be looked upon as mentally defective persons. Many of these cases are curable, and much can be accomplished by rest of the body and mind, together with appropriate tonics and attention to the primary cause of the trouble. See Dubois, *The Psychic Treatment of Nervous Disorders*, New York, 1905.

FECAL VOMITING.—A very annoying as well as sinister symptom, which occurs as a result of the narrowing or occlusion of the intestinal canal in any part of its length (for instance, in incarcerated hernia). The excrements situated above the obstacle, not being able to find their natural exit downward, are passed into the stomach by retrograde movements of the intestine, and are vomited from the stomach. Vomiting of a truly fecal character takes place only when the intestine is obstructed in its lower portions, as the upper portions of the bowel (duodenum and jejunum) do not contain any formed excrements. Fecal vomiting is always a grave symptom, and requires immediate surgical treatment.

FEET, PERSPIRATION OF.—See SKIN, CARE OF.

FEL BOVIS (OX-GALL).—The fresh bile of the ox, *Bos taurus*. It has only recently been introduced into medicine as a stimulant to the biliary secretions. Ox-gall, either in the form of enemata or of pills, is of service in chronic constipation and obstipation due to insufficient activity of the liver. It is given in doses of about five grains.

FELON.—See RUNROUND.

FENCING.—An excellent form of exercise which has been practised by man ever since he has had weapons. The practise is in vogue at the present day, and the weapons used are either foil or broadsword. Owing to the requirements of dexterity, of reliability of sight, and of strength of arm, it may be recommended to healthy persons of younger years. If the various cuts and thrusts are executed, not merely against a wooden manikin, but against an actual opponent, it is necessary to protect the head and body by masks and plastrons.

FENNEL.—See FENICULUM.

FERMENTS.—Substances that act in some unknown manner on other substances, bringing about chemical changes, and yet not themselves entering into the reaction, have been termed ferments, or enzymes. Both inorganic and organic ferments are known. Platinum black, manganese, and other metals, in finely powdered forms, are known to show the characteristics of ferment action. The most important of the ferments, however, are of organic origin, and may be either of animal or of plant manufacture. The digestive ferments *pepsin* and *trypsin*, from the stomach and pancreas respectively, play an important rôle in the breaking down of proteid foods; while the *ptyalin* of the saliva and the *amyllopsin* of the pancreas act on carbohydrates, rendering them capable of absorption into the lymphatics. *Steapsin* is another pancreatic ferment, and is indispensable in the digestion of fats. Other ferments are known in the human body, such as *thrombin*, or the fibrin ferment, the enzyme which causes the blood to clot. Oxidizing ferments are known that behave in a manner similar to laccase of Japanese shellac. The body probably contains many important ferment-like substances, which are not yet known.

Of the organized ferments, the yeast and bacteria plants are of particular interest, the former especially on account of their property of breaking down sugars to form alcohol, carbonic acid, and water. The bacteria also show marked ferment action. Many of them set free a clotting ferment, as is seen in the clotting of milk, where an action takes place corresponding to the coagulation of the blood. A similar action is exerted by rennet on milk. The formation of plant jellies is caused by a similar clotting ferment—*pectase*. The study of the ferments and of fermentation is as yet only in its infancy.

FERRUM.—See IRON.

FETUS.—See PARTURITION.

FEVER.—A rise of the temperature of the body above the normal, which is 98.6° F. (99° F. by rectum). It is, as a rule, a symptom of the body's reaction to some form of infection, and, like pain, it should not be regarded as a disease of itself, but as an indication of a disturbance in the heat-regulating apparatus, due to infection or poisoning. For this reason physicians do not lay the principal stress upon the reduction or removal of the fever, prominent and alarming though it may appear to the laity; but they devote their chief attention to the underlying cause. The patient would be benefited but little if, for instance, no notice was taken of the severe intestinal disturbance in typhoid fever, or to the focus of inflammation which endangers life in pneumonia, and attention paid only to the reduction of the temperature.

It may be questionable whether the treatment of fever is ever justified without special reasons. That is to say, there are many indications which point to the fact that fever is one of the body's methods of self-defence in its

struggle against the germs that have invaded it. Several investigators have been able to prove beyond a doubt, that many varieties of bacteria experience a weakening of their vital energy and strength at a temperature of 99.5° F., so that they can no longer exert as destructive an activity in the body they have invaded. In many acute infections, such as pneumonia, for instance, the disease begins with a violent chill. This is due to the fact that the smallest vessels of the skin contract at the onset of fever, thereby causing an accumulation of blood in the interior of the body, and thus raising the temperature. This accumulated heat is thrown forward to meet the enemy, as it were, and if possible to kill off the invading micro-organisms. The increase in the temperature of the body is therefore due, in the first place to a diminished expenditure of heat, and secondly to an increased formation of heat.

The degree of fever to be considered is difficult to establish. Age and sex, motion and rest, morning and evening, exert some influence upon the temperature of the body. Even in conditions of complete health, high temperature may result from bodily exertion, from abundant eating, or from hot baths. A temperature which is entirely without significance in a strong child may cause serious considerations in the case of a debilitated or aged person. The classification of fever temperatures can therefore at most be considered of only a general value, subject to special laws in each individual case. Temperatures of 99.5° to 100.5° F. are considered as mild elevations; 100.5° to 101.5° F. as slight fever; up to 103° F. as moderate fever; up to 105° F. as considerable fever; and temperatures above 105° F. as high fever. Disregarding exceptional cases (for instance, 122° F. observed in a case of injury to the spinal column), the highest temperature within the limit of life is, on an average, 107.6° to 108.5° F. But, as stated, a patient's temperature alone will give no absolute indication as to his condition. It is well known that children often show high temperature reactions even in slight disorders; such as 104° F. in constipation. In some diseases there is a regular alternation between morning and evening temperatures (for instance, in hectic fever in tuberculosis); and a reliable opinion can be formed only if the pulse is taken into consideration simultaneously with the temperature. The pulse-rate usually bears a certain relation to the height of the fever. Thus a temperature of 100.4° F. with a pulse-rate of 120 a minute (the normal rate being about 72) must be considered much more serious than a temperature of 103° F. with the same or a smaller number of pulse-beats. Thus, it is not infrequently found that a serious attack of appendicitis is accompanied by only a moderate rise in temperature (102 to 102.5° F.), but the pulse-beat is very rapid. This offers more evidence of the seriousness of the affection than does the temperature. On the other hand, the reverse situation may be encountered in other affections, as, for instance, in meningitis.

Brief attacks of fever in strong persons often require very little treatment, provided that the body is not prevented from giving off the excessive and annoying heat by means of nonsensical piling on of bed-clothes. To cause the disappearance of high temperatures for a few hours by medicines, is merely a kind of self-delusion which a layman should never attempt on his own responsibility. If sufficient relief is not obtained by ample ventilation of the sick-room (without exposing the patient to a draft) and slight covering of the body, it is permissible to resort to cool ablutions, moist packs, and cool baths (77° to 83° F.) until the physician arrives. In order to determine whether fever is present, it is essential to measure the temperature with a clinical thermometer, as it can not be done by merely feeling the forehead (see OBSERVATION OF THE SICK). Many patients may have high internal temperatures although their skin is cold.

At the present time it is unscientific to speak of simple fever. Practically every rise in temperature is due to a definite disturbance. The vast majority of these disturbances is due to infection from micro-organisms, or to their poisons. All patients with fever should be watched carefully until the cause is established. Children with sudden rises of temperature should be isolated at once if other children are in the family, for the fever may be the initial symptom of a contagious disease, such as measles, scarlet fever, whooping-cough, etc. On the other hand, it may be only a symptom of constipation, but parents can not be too careful in their attempts to avoid contagious diseases. The ounce of prevention is worth many tons of cure. Neglect often leaves hearts that sorrow for a lifetime. There is only one general rule that is safe in practically all cases. Isolate the patient, especially if a child; give a cathartic, and let the family doctor decide as to the cause of the fever. He may not be able to tell at once, but in time the precise cause may be learned.

FIFTH NERVE.—See THE NERVOUS SYSTEM, in INTRODUCTORY CHAPTERS (p. 67).

FIG.—The partly dried fruit of a small shrub or tree, *Ficus Carica*, native to southwestern Asia, and extensively cultivated in tropical and semi-tropical lands. Figs contain from 50 to 60 per cent. of glucose, with gum, fats, salts, and a high percentage (15 per cent.) of cellular tissue. By reason of the large amount of sugar, figs are useful in overcoming chronic constipation, toward which end the indigestible cellulose and seeds contribute, if they do not play the major part.

FILARIA.—The name of a widely distributed genus of small parasitic worms found extensively throughout the world, and often the cause of serious disease in man. The name is derived from the Latin *filum* (meaning "thread") and refers to the thread-like shape of these worms. The most important of the different species of filaria are *Filaria medinensis* or the guinea-worm, *Filaria loa*, and *Filaria Bancrofti*, known also as *Filaria*

sanguinis hominis. A number of other species are known, but they are better discussed in works on worms.

The guinea-worm is one of the best known of the various species, as it has been written about from the earliest times. It has been assumed that the fiery serpents that plagued the children of Israel were these worms, and the sacred and medical books of the East, as well as those of the middle ages, abound in references to this scourge. The length of this worm varies between 12 and 15 inches, and its breadth between $\frac{1}{4}$ and $\frac{1}{8}$ of an inch, and it is more or less uniformly thread-like in general shape. Two sexes are known, male and female, and the female is often found as a parasite in the human skin. It is thought that the young worm is harbored in the bodies of certain minute water crustaceans (*cyclops*), and that it is either taken in with the drinking-water or occasionally enters directly into the skin in those whose occupation requires them to stand for a considerable length of time in water which is liable to be contaminated. The worm is very frequently found in many of the lower animals, and it grows to its full size in cattle, horses, dogs, and wild cats. The affection which may be caused by the worm is in the nature of a boil or abscess. It is most frequently found in the lower extremities, especially in the feet and ankles, but it may also be found in different parts of the body. Until the worm appears at the surface, its presence is rarely detected; and very frequently a running sore may have at its base, half an inch or so below the surface, a collection of these worms. The native home of the *Filaria medinensis* is largely Africa, and it is interesting to note that in the early days of slavery this disease was comparatively common among the negroes of the United States. However, it has not to any great extent found a home in the southern states, and original cases are extremely rare.

The *Filaria loa* is not so well known. It is smaller, and comes from about the same region as the *Filaria medinensis*, namely the Gold Coast of Africa. Like the guinea-worm, it is in all probability first introduced into the lower forms of crustaceans, and thence into man through the drinking-water. As a rule it chooses the orbital region rather than any other part of the body, but it is known to occur also in other situations. Not infrequently it has been known to enter the eyeball itself, and medical records enumerate thirty or forty cases in which the worm has been extracted from the eyeball. Most frequently, however, it is located in the region beneath the eyelid.

The *Filaria Bancrofti*, known also as *Filaria sanguinis hominis*, is an extremely interesting parasite, as it is very frequently found in the human body. It is thought to be communicated to man largely through the influence of mosquitoes, and it is not at all impossible that it is obtained through drinking-water, especially water in which mosquitoes are apt to breed. The parasite usually develops in the lymphatic tissues of the body, and may also

be found in the blood stream, but it is more likely to occlude the large lymphatics and bring about their dilatation, thereby causing the characteristic picture of elephantiasis—enlarged veins and monstrous structures in different parts of the body. It is a comparatively common parasite in the tropics of Asia, Africa, and Australia, and in some islands of the southern Pacific, particularly in Samoa, where it is stated that forty or fifty per cent. of the inhabitants are infected. Thus far it has not obtained a strong foothold in the United States, although it is not unlikely that it may spread. A large number of closely related *Filaria* are known, but they can not all be considered in this place. See also the article on WORMS.

FINGER PARALYSIS.—See PARALYSIS.

FINGER SNAPPING.—Many persons are able to make a cracking noise by bending or stretching their fingers beyond a certain point. This is due to the fact that, owing to inequalities and to nodular thickenings in the tendon, a stronger pull is required to make the tendon pass through the narrow portions of its sheath. Therefore, as soon as the narrow point is passed, the tendon slides with a jerk into the desired position. It seems, however, that changes in the phalanges, uneven joint-surfaces, etc., may sometimes be factors in causing this phenomenon. It is a useless and harmful trick, which frequently injures the joints; if practised often it almost invariably leads to joint-deformities.

FISH-SKIN DISEASE (ICHTHYOSIS).—A disease characterized by dryness of the skin of the entire body. The natural fat of the skin is absent; it is rough and lusterless, and appears as if covered with dust. The uppermost layer of the skin is variously fissured, especially on extensor surfaces, so that smaller or larger, round or polygonal, scale-like plates develop. The scales are either thin, white, and glistening, or thick and of a greenish-gray color. In the center they adhere to the base, whereas they are free at the edges, and they constantly drop from the skin. The armpit, elbow-joint, knee-joint, and the inguinal fold are exempt from the disease. Owing to the fissures of the upper layer of the skin, the malady is annoying and unsightly, but it is never dangerous. The treatment consists of baths, soap ablutions, and embrocations of fat. Ichthyosis is probably a hereditary affection.

FISTULA.—An abnormal, more or less narrow passage which either leads from a cavity of the body, or from the interior of an organ, to the surface of the body; or establishes a connection between two organs, as for instance, between the bladder and the vagina. Complete fistulas are to be distinguished from blind ones in that the latter have but one opening.

Fistulas are mostly due to deep-seated, chronic, purulent inflammations, which finally discharge through the skin (bone and breast fistulas). They may result from injuries; for instance, from penetrating foreign bodies such as bullets or splinters which were not removed in time; or from the injury

due to long-lasting pressure of the infant's head in difficult deliveries. This last-named cause may give rise to a fistula between the bladder and the vagina. Disturbances of the development of the fetus in the womb frequently give rise to fistulas by causing parts to remain open which should have been united (throat and navel fistulas).

Fistulas are named according to their location, or according to the fluid discharged from them. Thus, in many old tuberculous bone-diseases, *tuberculous fistulas* develop. These lead down to dead and dying bone. Openings from the intestines result in fecal fistulas. With regard to rectal fistulas, which are very common, see RECTUM, DISEASES OF. The treatment of the affection, which rarely heals spontaneously, often encounters great difficulties; surgical interference is normally required.

FIT.—See CONVULSIONS.

FLATFOOT.—A deformity caused by the breaking down of the normal arch of the bones of the foot. It is characterized by the fact that the affected foot, in the standing position, touches the ground with all parts of the sole instead of with only the heel and the balls of the toes (see Figs. 38, 39). The condition of being flatfooted is associated with many annoyances. The patients tire readily, they are not able to stand for any length of time or to walk far, the feet are very liable to perspire, and varicose veins arise upon the lower leg and the foot. Persistent local pains, often treated for years as rheumatism of the feet, particularly by quacks, are almost invariably due to this condition. The affection develops principally in young persons who are obliged to stand constantly, or who perform hard work while standing. Any one, therefore, who has a tendency to this condition should not select a calling which imposes special strain on the feet; or should in time exchange it for another. Flatfoot sometimes occurs as a congenital defect; and it may be acquired also by injuries to the foot, for instance, after fracture of the heel-bone. The treatment consists in massage of the muscles of the lower leg and foot, together with the wearing of special insoles (see Fig. 141) and splints. Very severe cases must be cured by operation. Special shoes are advisable; but they should be ordered by a competent physician and not by a shoemaker.



FIG. 141. Insole for the correction of flatfoot.

FLATULENCE.—A condition due to excessive fermentation or putrefaction of food in the intestinal canal, and characterized by the discharge of gases from the stomach or through the anus. The gastro-intestinal canal always contains a certain amount of gases, which in excessive quantities may produce a very tense condition of these organs. Ordinarily these gases are passed with the stools. If ejected at other times, they are very noticeable

on account of their odor which resembles that of rotten eggs, and which is due principally to the contained hydrogen sulfid gas. Any considerable increase in the quantity of intestinal gas is usually due to increased decomposition of the food in the intestine. If foul-smelling, it may be due to the ingestion of a large quantity of proteid materials, such as meats, eggs, etc. Gases of an acid smell are usually due to fermenting carbohydrates, starches, sugars, etc. A profuse development of gas is not harmful, so long as the contractions of the intestinal musculature are sufficiently strong to expel it. But when the gas collects, it causes more or less distention of the various intestinal loops, as well as of the abdominal walls, from which much discomfort with colicky pains may result.

The expulsion of gas is prevented in cases of paralysis of the intestinal muscles, such as may be seen in inflammations of the appendix or peritoneum; also in partial or complete occlusion of the lumen of the bowel, and in volvulus. In these conditions, inflation of the gut is one of the serious symptoms. In ordinary cases there is merely a feeling of fulness and distention in the abdomen, sometimes colicky pains, but the discomfort soon passes away. But when the pain persists for a time, it should not be ascribed to gas and subjected to various household remedies in the hope of improving it. Gas is not always the cause of such painful attacks, and much valuable time may be lost during which it would have been wiser to have called in a physician. Various remedies are employed in order to prevent to some extent the formation of excessive amounts of gas; but it is most important that the bowels be thoroughly emptied daily. Continued flatulence is an evidence of dietetic indiscretion, or of dyspeptic disorders.

FLAXSEED (LINSEED).—The seed of the flax-plant or *Linum usitatissimum*, a plant which is native to Europe and widely cultivated in different parts of the world. The seeds, which contain mucilage, oil, and starch, are widely used as a poulticing material in the form of a paste. By reason of the large percentage of fat or oil that the seeds contain, the heat is retained for a long time. Flaxseed has no inherent healing properties of itself. In fact, it is a very unhygienic and insanitary form of dressing; and it has simply its convenience, cheapness, and adaptability to recommend it. A mixture of equal parts of linseed-oil and lime-water, called Carron oil, is one of the best local applications for burns. By virtue of the mucilage which it contains, flaxseed-tea makes a very palatable demulcent, particularly in sore throats and in irritated conditions of the stomach and intestines. It is especially valuable following the administration of poisons.

FLESH.—See MEAT.

FLUKES.—See PARASITES.

FÆNICULUM (FENNEL).—The dried fruit of *Fœniculum vulgare*, a herb extensively grown in southern Europe. In the United States it has more or less escaped from cultivation, and become naturalized. It contains

a high percentage of volatile oil, the most active constituents of which are camphors. Fennel is useful as a stimulant to the mucous membrane of the stomach, causing warmth, and increasing the intestinal movements; given together with cathartics it is capable of relieving cramped conditions. It is rarely used alone, one or two drops of the volatile oil being a sufficient dose.

FOODSTUFFS.—From a broad point of view foodstuffs include all those substances which are necessary to build up the body. These may be derived from organic nature, or from the inorganic world. Thus the oxygen of the air is one of the most important of the foods of the human body. Water is absolutely essential to the maintenance of life, eighty per cent. of the human body being composed of this food material.

In the usual acceptance of the word, however, foodstuffs include **only** those substances which are derived from the vegetable and animal kingdoms, together with the nutrient salts from the mineral kingdom. With the limitation to this simplified view it must be emphasized, in the first place, that any one who eliminates one of these three groups from his food, or uses them in undue proportion, will sooner or later suffer for it in health or in functional capacity. The abuse of nutritive salts is less liable to cause injurious manifestations, since they are naturally present in vegetable and animal foods, and therefore less subject to arbitrary preferences. Those who drink very large quantities of water will suffer from such excess; no less than those who drink no water at all. The strict vegetarian—it might be interpolated that there are none—will suffer as well as he whose diet consists exclusively of meat. Faddism in eating is one of the silly excrescences of the half-informed mind.

It is important to remember, however, that disturbances of health may be due to food. This refers not only to affections of the stomach and intestine, but also to a large number of metabolic disorders, such as obesity, the formation of calculi, migraine, diabetes, and gout. The excessive use of meat is objectionable, and those who stuff themselves with this article of food to the point of gluttony will find no advocates; but the same may be said with regard to vegetarianism in so far as it exists, most people who call themselves vegetarians including in their bill of fare such important animal foods as cheese, milk, and eggs. The first man known to history was a hunter and a nomad. He lived on meat and roots, if he could find them. In a higher stage of culture he became an agriculturist, and raised his cattle and wheat. Bread and meat are therefore the foods of thousands of years of adaptation.

Chemistry has demonstrated that all these foodstuffs (vegetable as well as animal) contain three primary types of substances which constitute the food required by man. These are *proteids* (containing nitrogen), *carbohydrates* (non-nitrogenous), and *alts*. Proteids are found in largest proportions

in meat, fish, caviar, cheese, milk, and in oysters and other shell-fish. They make up a considerable proportion also of legumes and cereals; and practically no organic substance is without a small proportion. Carbohydrates, or sugar-forming substances, are most abundant in plants, as legumes, cereals, fruits, and vegetables; they are present in small quantities also in most animal foods, as butter, lard, tallow, and oil. Hence all three types of nutrient materials are represented in all classes of foods. The exact figures for some foods are shown in Plate XIX., from which it will be seen that carbohydrates are derived principally from the vegetable kingdom; whereas proteids and fats may be obtained from either the animal or the vegetable group.

From a strictly chemical point of view, it makes little difference from which class of foods the different materials may be taken. They exist in varying proportions in all foods. A cow can grow fat on grass, but it usually has to eat for eighteen hours a day to do so. Physiological chemists have determined the exact quanta necessary to keep a man alive under different conditions (regarding work, etc.); and a dietary can be constructed to meet these demands. Comparative tables have been constructed to show the equivalents in food values, and a well-balanced dietary will include sufficient nourishment at a reasonable figure. Cheese, for instance, is one of the most valuable of foods, in proportion to its price. Another very important point to be considered is the subject of digestibility. For instance, on the surface it might be considered, and is very frequently so taught, that mushrooms are as useful as meat because they contain an equally high percentage of proteids. It must be borne in mind, however, that the proteids of the mushrooms are not fully utilized by the digestive organs; hence the very highly prized chemical factor is a misleading one. In fact, the chemical food experts have constructed very useful tables; but they are all defective, and are merely suggestive, because the problems regarding digestion have not been taken into sufficient account. Personal idiosyncrasy of digestion is also a disturbing factor. Thus, enormous differences exist with reference to the ability of different individuals to utilize fats. For this reason the card philosophies of the "nut-food" faddists often come to grief because of the indigestible fats that many nuts contain.

The general question of digestibility is one to which the layman is accustomed to attribute a fixed, and therefore erroneous, meaning. For it may be said that there is scarcely a subject of the human economy which is exposed to greater variations; and in no other respect does personal predisposition play a greater part than in that of the digestibility of food. A dish which may be readily digestible to one person, may be very troublesome to the digestive organs of another. The digestibility of a foodstuff depends not only upon its natural qualities, but also upon numerous other factors, such as appetite, palatability, and proper mastication.

Numerous tables have been constructed purporting to show the comparative digestibility of various foodstuffs. These, however, should be interpreted only in the most general way. In view of the many factors which, as has already been pointed out, enter into the question, one might almost say that they are worthless. Many of the individual idiosyncrasies are due to chemical reasons; others to mental reasons. There is very little use arguing with the man who says that milk disagrees with him. It is bound to do so as long as he thinks it will; for there is no part of the human body which is more profoundly subject to the impressions of the mind than the stomach. To reinforce the truth of this assertion, it is only necessary to refer to the relationship which the emotions bear to the appetite. An individual can make himself, as well as others, very miserable by constantly wondering whether or not a certain kind of food will agree with him.

There are still other factors that determine the digestibility of the various foods. Whether a greater or less amount of bile is present, is of importance with regard to fatty emulsification; variations in the pancreatic secretion affect all three types of food-principles, the fats particularly; and variation in the strength of the muscular coats of the intestines is also a determining factor in the question of digestibility. Then again, all foodstuffs are composites. Their contained sugars may diffuse rapidly; their proteids may soon be digested; and their fats last. Hence, any table pretending to tell when a substance is fully digested, is a delusion and a snare; it may be helpful in a most general way, but it should not be interpreted too literally. The following table is one widely quoted, but it shares the defects of all the others in that it contains too many general statements. Thus, to illustrate, it states that celery is digested in $1\frac{1}{2}$ hours, when, as a matter of fact, certain parts of the celery are never digested but thrown out in the feces. It is inserted here as an instance of one man's guess about the digestibility of certain foods. It might be surmised that it represents his personal experiences. They are worth so much and little more.

One hour: Boiled rice. *One and one-half hours:* Beaten eggs; barley soup; roast venison; stewed fruits; boiled trout; spinach; asparagus; celery; brains. *Two hours:* Boiled milk; turkey; boiled, pickled pork; baked potatoes; peas; beans; roast tenderloin. *Three hours:* Smoked ham; stewed mutton; boiled carrots; cabbage. *Three and one-half hours:* Boiled beef; roast pork; corned beef; boiled potatoes; fresh wheat-bread. *Four hours:* Boiled and broiled poultry; roast veal; dry bread. *Four and one half hours:* Boiled, fresh pork; boiled mutton. *Five hours:* Mushrooms; nuts. *Six hours:* Fried eels; stale corned beef. Fluids are absorbed comparatively quickly by the body. See also the articles on BREAD; FRUITS; MEAT; VEGETABLES; etc.

FORESKIN, DISEASES OF.—Diseases of the foreskin are generally accompanying symptoms of other diseases, especially of inflammatory

affections of the male organ. A congenital deformity of frequent occurrence is *phimosis*. This condition consists in an abnormal constriction of the prepuce, which makes it exceedingly difficult, if not altogether impossible, to uncover the glans penis. If the foreskin is forced back behind the glans, it frequently happens that it becomes impossible to again push it forward, in which case the constriction of the glans may give rise to edema. If the constriction and consequent swelling of the glans is allowed to remain for a prolonged period, gangrene may result. The same unpleasant conditions arise if the phimosis is the result of an inflammatory process. In congenital phimosis it is always advisable to resort to an operation (**CIRCUMCISION**). This should be done in early childhood, when the small size of the parts and the absence of sexual excitement give promise of a speedier healing. This operation will avert simply and permanently a deformity which under all conditions would promote the occurrence of inflammations and of sexual diseases. If the operative treatment has been neglected in youth, it must be undertaken later on.

If congenital constriction has already caused inflammation, an operation is generally the most advisable measure. The same treatment is indicated when the phimosis is due to inflammatory processes which fail to yield to the proper remedies. In such cases a forcible attempt to lay bare the glans may give rise to constriction and all its consequences; it is best, therefore, to expose the source of the inflammation in order to establish an exact knowledge of the disease, or to arrive at a more successful treatment. In all cases of inflammatory phimosis the treatment should be left to the decision of a physician. The fact should be emphasized, that the operation is always without danger, and the result favorable.

In the treatment of simple inflammation of the foreskin (a frequent result of gonorrhea), it is generally sufficient to observe quiet, to keep the member in an elevated position, to apply cool compresses to the sac, and to irrigate it with weak, non-irritating disinfectants. For the relief of constriction of the glans, medical aid should always be sought. When the condition is of recent occurrence, a return of the foreskin to its normal place is generally effective; in other cases operative interference is necessary. In all diseases of the foreskin it is essential to consult a physician as soon as possible, in order that the normal function of the male organ may be preserved. It is not advisable for the patient to attempt self-treatment.

FORMALDEHYDE.—A gas obtained by the incomplete burning of methyl alcohol or wood-alcohol. It is a very irritating and destructive gas, which is used in a solution of 40 parts to 100 of water. In the gaseous form it is widely used as a disinfectant; and in a weak solution of one-half to one per cent. it is used as an antiseptic wash; but by reason of its irritating qualities it is not adapted to surgical antiseptics. See **ANTISEPTICS**.

FRACTURES.—See **BONE, FRACTURES OF**.

FRANGULA.—The dried bark of the alder-buckthorn (*Rhamnus frangula*), a slender shrub indigenous to Europe and parts of Asia. Its active constituents resemble those of CASCARA (which see), and it is widely employed as a laxative and cathartic.

FRECKLES.—See SKIN, CARE OF.

FREEZING.—Distinction is made between three grades of freezing. The first grade is characterized by bluish-red discoloration of the skin, accompanied by considerable itching and painfulness; the second grade, by the formation of blisters which are usually filled with a blood-colored fluid; and the third grade, by gangrene of the frozen parts. The body of a frozen person is icy cold to the touch, the skin is pale, and the limbs are stiff. The respiration, if present at all, is scarcely noticeable; and the pulse can be felt only with difficulty. This condition may gradually pass over into death, as is not infrequently observed in persons who, worn out by a long walk or by the abuse of alcohol, lie down in the open air despite the cold, and fall asleep never to wake again.

The leading principle in the resuscitation of persons who are frozen should be *gradual* warming. The following method is an appropriate one: Remove the frozen individual into an unheated room; disrobe him carefully; rub the body with cold, wet towels, or with snow; or place him in a full bath of cold water (61° to 64° F.). Continue rubbing the body, slowly and gradually raising the temperature of the bath to 86° F. in the course of two to three hours. After the limbs have become a little more movable, resort to artificial respiration if necessary. When the patient begins to breathe spontaneously he should be placed in an unheated bed, and covered with blankets. The room should then be gradually heated to a moderate temperature; and later the patient may be rubbed with towels gradually made warmer and warmer. As soon as the patient is able to swallow, he may be given wine or other alcoholic beverages, as well as tea or coffee in large quantities. Consciousness is not fully restored until several hours have passed; sometimes only after days.

FROG-TONGUE.—See RANULA.

FRUITS.—The most important edible fruits are: the apple, pear, orange, lemon, banana, grape, peach, cherry, raspberry, strawberry, blackberry, huckleberry, pineapple, and fig. They all contain a large percentage of water, a moderate amount of carbohydrates, and small quantities of protein and fat. The table on page 354 shows the composition of the fruits enumerated above.

The process of drying lowers the percentage of water to about 20, and increases that of carbohydrates to about 70.

The nutritive value of fruits is comparatively small, depending chiefly on the percentage of carbohydrates which they contain. They influence the system beneficially, however, on account of their salts and acids, for which

reason they are to be especially recommended to persons suffering from habitual constipation. Fruits also tend to stimulate the appetite, a virtue which gives them a value far superior to that of their actual nutrient qualities.

The composition of nuts differs widely from that of the fruits considered in the foregoing. With few exceptions, they contain very little water (4 to 10 per cent.), while their percentages of carbohydrates, protein, and fat are high. The almond, for instance, contains more than 20 per cent. of pro-

Fruit	Water per cent.	Fat per cent.	Protein per cent.	Carbohydrates per cent.	Salts per cent.
Apple.....	84.7	0.5	0.5	13.9	0.4
Pear.....	84.5	0.5	0.7	13.8	0.5
Orange.....	87.0	0.3	1.0	11.1	0.6
Lemon.....	88.9	0.8	1.0	8.9	0.4
Banana.....	75.7	0.7	1.5	21.1	1.0
Grape.....	78.0	1.7	1.4	18.2	0.7
Peach.....	79.2	0.3	1.2	18.7	0.6
Cherry.....	81.2	0.9	1.1	16.2	0.6
Raspberry.....	86.0	0.3	1.2	11.8	0.7
Strawberry.....	91.0	0.8	1.2	6.3	0.7
Blackberry.....	87.1	0.9	1.5	9.9	0.6
Huckleberry.....	82.1	0.7	0.8	16.0	0.4
Pineapple.....	90.0	0.4	0.5	8.6	0.5
Fig.....	78.6	0.3	1.7	18.7	0.7

tein, more than 50 per cent. of fat, and nearly 20 per cent. of carbohydrates. Nuts, therefore, contain nutritive substances in abundance; but they are not readily digested. They are largely used in the manufacture of candies and cakes; while some nuts yield valuable salad-oils. For such fruits as the tomato, melon, cucumber, etc., see VEGETABLES.

FRUIT-WINES.—Several varieties of fruits and berries are used for the manufacture of wines. Among these are huckleberries, currants, gooseberries, pears, and apples. The mode of preparation is much the same as that of grape-wine. The fruits are pressed and the juice left to natural fermentation until it is ripe for bottling. To currant and huckleberry wines a large quantity of sugar is usually added at the beginning of fermentation, thus increasing their contents of alcohol to as much as 16 per cent., and causing them to resemble southern wines. Cider is generally prepared from apple-juice, and usually contains about 5 per cent. of alcohol, or the same amount as strong beer.

FURUNCLES.—Affections originating in a hair-follicle or in a gland of the skin, and generally due to uncleanness. They are located especially on those parts of the skin which are subject to pressure or friction; for instance, on the neck (resulting from narrow and stiff collars), on the shoulder (due to pressure of the suspenders), and on the loins and hips (as a consequence of tight waist-bands). Furuncles are often caused also by improper water-

cures; and sometimes they arise in connection with general affections, such as tuberculosis, or diabetes mellitus.

Furuncles have nothing to do with impurity of the blood; they are *local* inflammations only. As a rule several furuncles arise at the same time. The affected parts of the skin are red, inflamed, smooth, glistening, and painful. After a few days a point of pus develops in the center of the inflamed part. This pus may be pressed out with clean hands, or the furuncle may be opened with a needle which has been previously heated over an alcohol flame. It is best to consult a physician as early as possible; and such consultation is absolutely necessary if the furuncles are very large. This will best prevent serious consequences, such as supervention of erysipelas, etc. As a result of an infection with the pus of an existing boil, new furuncles may develop upon adjacent portions of the skin. For this reason it is popularly and correctly maintained that "the occurrence of one boil is followed by seven others." In order to prevent further infections, it is therefore advisable to lead a temperate life and to attend carefully to the cleanliness of the skin.

Extremely numerous furuncles are often observed in small children, especially in such as are scrofulous, or debilitated by other diseases. These boils should be opened as early as possible by a physician, as neglect of the condition is very apt to result in extensive inflammations. Baths with disinfectants added to the water are also beneficial.

G

GALLA (NUTGALLS).—These are excrescences on various species of oaks, produced by puncture and the depositing of ova by certain insects (*Cynips*). The galls contain a high percentage of tannic acid, and are used in medicine for much the same purposes as the latter; namely, for astringent mouth-washes and douches, and occasionally in the treatment of subacute and mild diarrheas.

GALL-STONES.—Stones which develop in the gall-bladder or (occasionally) in the liver. Ancient physicians regarded them as due to simple inspissation or drying up of the bile; but at present the real cause is considered to be due to chemical changes in the bile, which in turn probably result from an inflammation of the mucous membrane of the gall-bladder. Three-fourths of all cases of gall-stones occur in women, generally after the fortieth year of age. This extreme frequency is undoubtedly related to the habit of wearing tight corsets which may obstruct the flow of the bile. Many physicians assume also that there exists a certain connection between pregnancy and the formation of gall-stones. People of sedentary habits often suffer from this complaint; and it is ascribed also to overeating

(especially of meat) and to excessive use of alcoholic beverages. In certain districts the occurrence of gall-stones is very frequent, and has been ascribed to an abundance of lime in the drinking-water. Bacterial infection, especially typhoid, is an important causative factor; and in certain families it seems that heredity also plays a part.

The size of gall-stones varies from that of a grain of sand to that of an egg. Sometimes only a single stone is found, but usually ten to fifteen small ones accumulate, and cases are on record in which as many as one thousand, and more, have been found in one gall-bladder. The stones are generally round, or sharp-cornered (see Plate XIII., 2), although at times they are pear-shaped like the gall-bladder. Their surface may be either uneven or smooth, and their colors vary between all shades of green, brown, yellow and black. When fresh, they can be crushed between the fingers. Gall-stones are usually composed of the same materials which form the constituents of the bile: cholesterin, lime-salts, etc.

In some cases it happens that persons affected with gall-stones remain unaware of this fact, the stones being accidentally discovered at an autopsy. In other cases the patients suffer but slightly, and the stones are found in the excrements by mere accident; this is especially often the case in the aged. The presence of gall-stones is generally recognized by attacks of so-called gall-stone colic. This colic is brought about when the stones, on leaving the gall-bladder, become engaged or stuck in their passage through the bile-ducts. Such an attack may take place but once, or it may recur at varying intervals of months or years. Many persons become subject to such attacks after riding or dancing, or after vexation, but especially after eating too much. During the attack the patient is affected by a boring, burning, piercing, or crushing pain in the pit of the stomach or in the right side of the abdomen; this pain may radiate into the right thigh and testicle, into the back, and into the right (rarely into the left) shoulder and upper arm. The pain, which is often all but unbearable, causes the face to become distorted with a look of fright, and the forehead to be covered with cold sweat. The patient presses his fist into the region of the liver, and leans forward with his knees bent; often he writhes on the floor in his agony. The abdomen in the region of the liver is extremely sensitive to pressure; and when the region of the gall-bladder is touched, the patient may scream with pain. Violent chills and fever, vomiting, hiccup, etc., are frequent manifestations of the affection. The stools are generally retarded, and the quantity of urine is scant. Unconsciousness is not an infrequent accompaniment of an attack. An attack generally lasts from three to five hours, and although it usually terminates favorably it is often followed by jaundice. Some patients have frequent attacks of gall-stone colic which may not be recognized as such; and they are not infrequently treated for other affections.

In order to prevent the disease it is advisable to regulate the diet carefully, and to eat only simple food in moderate quantities. Excesses in eating or drinking, as well as strong spices, should be avoided. Bodily exercise is very beneficial for those who follow sedentary callings. A certain amount of caution should, however, be observed as to the form of exercise selected. Curative gymnastics are useful, and attention to regular movements of the bowels imperative. Women should lay especial stress upon a rational mode of dressing, and should avoid the wearing of tight corsets.

It needs hardly be mentioned that it is necessary to secure the advice of a physician, especially in an attack of colic. Until the physician arrives, attempts may be made to alleviate the pain by applying hot compresses to the painful parts of the abdomen, by drinking hot water, milk, or tea, and by administering a hot bath (104° F., or over). In many cases, however, cold applications are borne better than warm; and under such circumstances an ice-bag may be applied to the region of the liver.

A course of treatment at some medicinal spa is often beneficial for the prevention of recurrences. Among *European* resorts may be mentioned Carlsbad, Neuenahr, and Vichy; among *American*, Virginia Hot Springs, Alma Springs, Mt. Clemens, etc. Those whose means do not permit them to visit any of these resorts, may take a "Carlsbad Cure" at home. Internal medication rarely relieves severe cases of gall-stones. Surgical aid must be sought, and it is a fact that hundreds of patients have been saved by operative measures. But a successful issue may not be expected if the surgical treatment has been too long delayed.

GAMBOGE (CAMBOGIA).—A gum resin obtained by incision into the trunk or larger branches of the *Garcinia Hanburii*, a Siamese tree. It occurs in the market in cylindrical rolls, from one to three inches in diameter, bright yellow to orange red in color, without any smell, but with a very acrid taste. It is readily diffusible in water, forming a yellow emulsion. Gamboge is a powerful cathartic, producing a large watery stool. The dose for this purpose is from two to five grains, given either in pill or emulsion. It causes much griping, and also nausea and vomiting, and is therefore rarely given alone. Overdoses may cause death. The drug is employed also for the expulsion of tapeworms, in doses of ten grains or more. Gamboge is not a safe remedy, and should never be taken unless prescribed by a physician.

GANGLION.—A hard tumor proceeding from the sheath of a tendon or from the capsule of a joint. Sinews and joints are surrounded by a firm tissue, called respectively tendon-sheath and joint-capsule, which secretes a mucous fluid. This latter lubricates the sinews and joint-surfaces, and keeps them smooth. After continued severe exertion, an increased quantity of this fluid is secreted, and is collected in blind pouches (or *diver-*

ticula) developed from the tendon-sheaths and joint-capsules. The connection between this pouch and the joint-capsule or tendon-sheath (as the case may be) is sometimes entirely lost, and the sac becomes closed on every side. These diverticula are called ganglia, and distinction is made between those derived from tendon-sheaths and those that develop from joint-capsules. Ganglia occur principally over the wrist and over the extensor tendons of the arm (for instance, in piano-players). They are painful, and create a sensation of tension. It is sometimes possible to crush them by firm pressure, but they generally reappear; besides, this method of treatment, in which the family Bible or dictionary is used, is highly dangerous. Massage and great care of the hands are advisable. Stubborn ganglia which cause considerable annoyance may be permanently removed by operative interference, without incurring any functional disturbances of hands or fingers.

GANGRENE.—Term applied to the death of parts of the body, due to impairment of their blood-supply. Fingers and toes, being furthest



FIG. 142. Moist gangrene.



FIG. 143. Dry gangrene.

removed from the heart, are usually the first to suffer. Gangrene may be recognized by the black color which the limb assumes, and by the wrinkled condition of the skin. It may be either humid or dry, depending upon whether the affected parts contain fluids which cause decomposition, or whether the dead part simply becomes dry and shrivelled (see Figs. 142 and 143).

Gangrene is observed in old people, in certain nervous diseases, in diabetes, with obstruction of a blood-vessel, from the effects of extreme heat or cold, from cauterization by corrosive acids, from the ingestion of large amounts of certain medicinal substances, and, finally, as the result of severe inflammations. The gangrenous parts may become gradually separated from the body in consequence of inflammatory processes. Treat-

ment must be primarily directed to the cause of the trouble, and on account of the dangerous character of the latter it must be carried out with extreme care. Hospital gangrene is a particular variety which usually affects fresh wounds and is very contagious. It produces crater-like ulcerations, and is followed by extensive sloughing of the tissues. Thanks to the modern methods of wound treatment it has now practically disappeared.

GAS-POISONING.—See ASPHYXIA; POISONING.

GASTRIC FEVER.—Term used to designate the comparatively rare cases of catarrh of the stomach which are accompanied with a marked degree of fever and with severe general symptoms, such as headache, dizziness, or delirium. The disease may also be called febrile catarrh of the stomach. Formerly the designation “gastric fever” was often used for many diseases which are now recognized as mild forms of other affections, such as typhoid fever, influenza, etc. The treatment includes cold compresses to the head, cold packs, etc., together with measures directed to the removal of the digestive disturbances. See *Catarrh of the Stomach*, s. v. **STOMACH, DISEASES OF.**

GASTRITIS (INFLAMMATION OF THE STOMACH).—See **STOMACH, DISEASES OF.**

GAULTHERIA (WINTERGREEN).—The dried leaves of *Gaultheria procumbens*, a very widely distributed herb growing in most parts of North America. Its active principle is a volatile oil containing a high percentage of methyl salicylate. Like the salicylates, the oil of wintergreen is used in the treatment of acute articular rheumatism, and may also be used externally for the relief of neuralgia and local pains.

GELATINUM (GELATIN).—The dried product obtained from the skin, ligaments, and bones of animals after treatment by boiling and removal of water. Gelatin is insoluble in cold water, but swells on immersion, and absorbs a quantity of water equal to ten per cent. of its weight. It is soluble in boiling water; and a solution of one part gelatin to 50 parts of water solidifies upon cooling, and is widely employed in the household as an important constituent of soups and of various jelly-like dishes. In pharmacy gelatin is used very widely as a coating material. In medicine it has no particular value, but it has been employed in surgery for certain technical purposes. Gelatin is not utilized to any great extent by the body, its sole value as a food substance being that of sparing other constituents, notably proteids. Thus, while it may be said that gelatin has no direct food value, it may be seen to serve indirectly a useful purpose.

GELSEMIUM.—The dried roots of *Gelsemium sempervirens*, or yellow jasmine, a woody twiner, climbing over moist woodlands in the southern United States, and extending also into Central America. It contains an amorphous alkaloid, *gelsemin*, and an acid, *gelsemic acid*. This latter is thought to be identical with the substance found in the root of *scopola*.

Gelsemium acts upon the motor end-organs in the muscles, depressing their activity; in large doses it may cause paralysis of the muscles, notably of the eyelids and extremities. It also affects the sensory end-organs, thus diminishing the sensation of pain, and it has been used to some extent in the treatment of neuralgia. It is a dangerous drug, and can be used only with considerable caution.

GENERAL PARESIS.—See BRAIN, SOFTENING OF; INSANITY.

GENTIAN.—The dried root of *Gentiana lutea*, or yellow gentian, a plant growing widely in the mountainous districts of southern and central Europe. It contains a number of fatty and resinous principles, and several bitters which are probably glycosids, such as *gentiopicroin* to which the taste and action of the drug is due. Gentian is used in medicine as a bitter, increasing the appetite and promoting the flow of saliva and of the gastric juice; it is thus efficacious in various types of dyspepsia and constipation which are often due to digestive disturbances. It is frequently used in the form of a compound tincture in doses of from 15 drops to one-half teaspoonful.

GERANIUM (SPOTTED CRANESBILL).—The dried rhizome of *Geranium maculatum*, a perennial herb very widely distributed, and growing abundantly in the eastern and central parts of North America. It contains tannic acid, sugars, and gums, and is useful as an astringent. At one time it was very extensively employed in the treatment of various types of diarrhea, particularly in children, in which class of patients it is well borne because of its agreeable taste and non-irritating qualities.

GERMAN MEASLES (RUBELLA).—For some time it was an open question whether rubella was an independent disease or merely a variety of measles or scarlatina. Only within the last fifty years has the opinion become prevalent to look upon rubella as an independent infectious disease. If it were merely a milder form of measles or scarlatina, recovery from either of these diseases would protect against an infection by rubella. Such, however, is not the case.

Rubella most frequently affects children, and recovery from an attack usually renders the patient immune to the disease. The time elapsing between infection and the appearance of the eruption fluctuates between two and three weeks. Premonitory symptoms are generally absent. If present, they are similar to those of measles, varying in severity and in duration. They consist of slight cold in the head, cough, and of moderate sensitiveness of the eyes to light. In a number of cases these symptoms are not observed until after the appearance of the eruption.

The eruption, which resembles measles, appears first on the face, and spreads rapidly over the entire body. In some cases it is visible for only a few hours; in others, for several days. The spots are separate, round, pale-red in color, about the size of a pea, and slightly raised above the skin. Scaling is either very slight (dust-like), or altogether absent. The

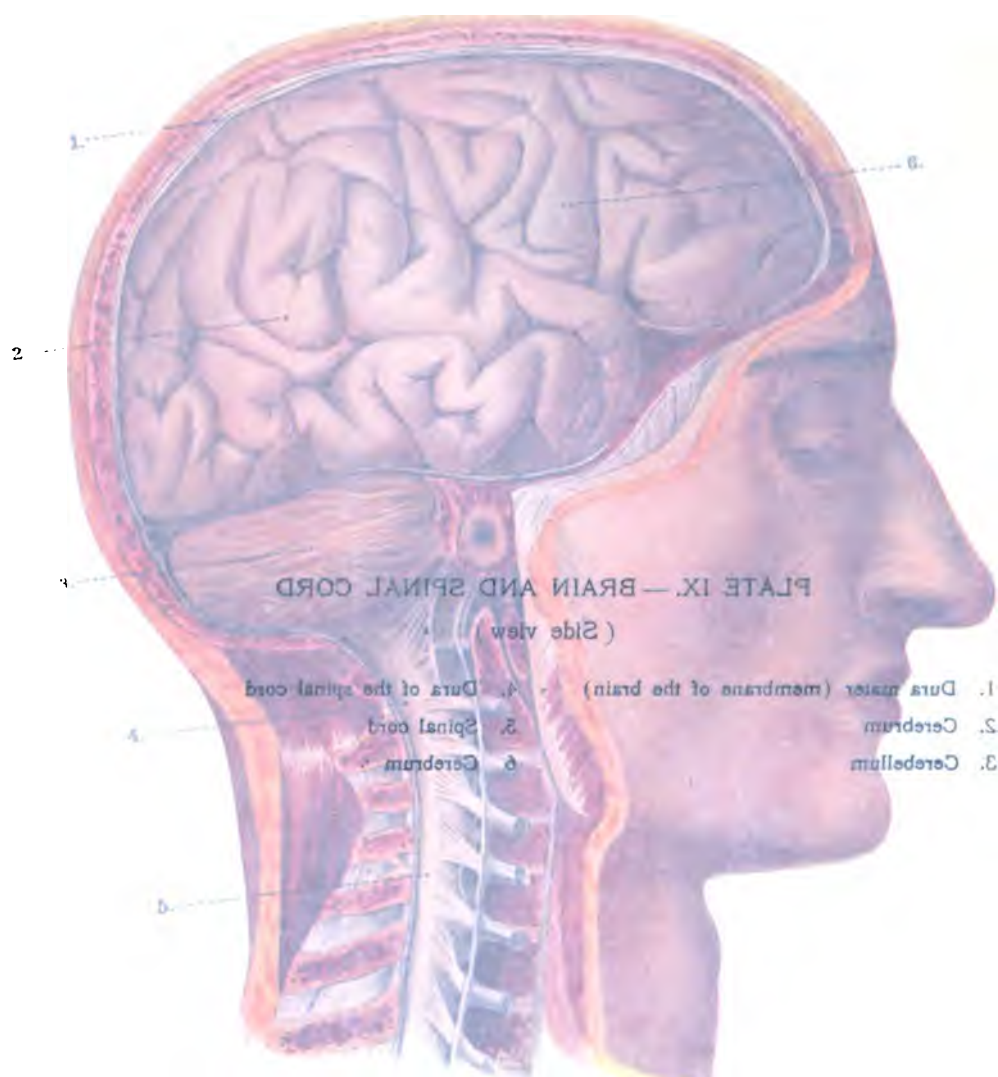
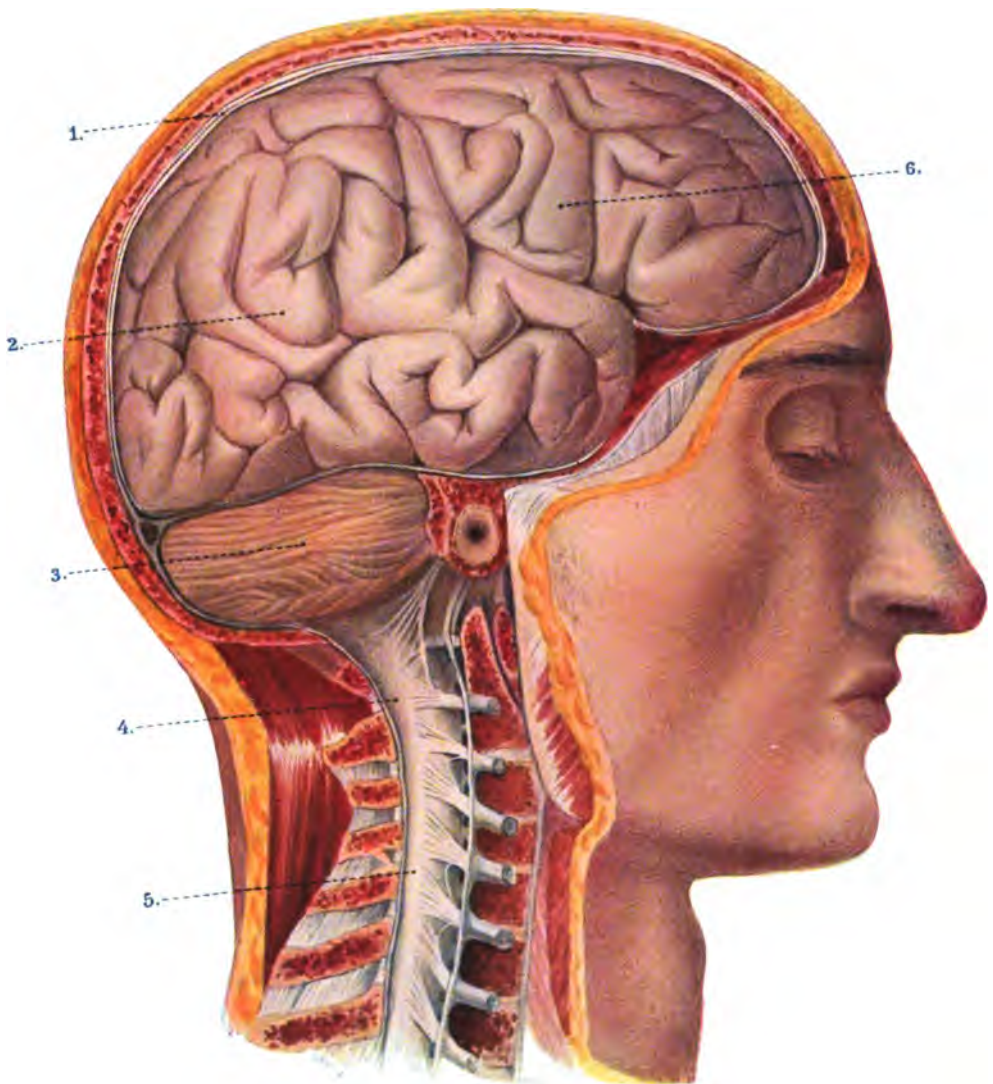


PLATE IX. — BRAIN AND SPINAL CORD
(Side view)

- | | |
|---------------------------------------|----------------------------|
| 1. Dura mater (membrane of the brain) | 4. Dura of the spinal cord |
| 2. Cerebrum | 5. Spinal cord |
| 3. Cerebellum | 6 Cerebrum |



mild catarrhal symptoms which accompany the affection disappear rapidly. Fever may be absent during the entire course of the disease. The disturbance of the general health amounts to little or nothing, so that it is difficult to make the sick children stay in bed. Incidents of any importance are usually absent, and the course of the affection is always favorable.

Rubella is most apt to be confused with a mild case of measles, and it requires a practised physician to distinguish one disease from the other. Since it is often difficult, even for the physician, to recognize the disease, it is obvious that a layman is absolutely unable to do so. It is desirable to isolate the patient from the rest of the family, as it is unnecessary to have even so mild an affection as German measles. If stricter precautions were taken with the milder affections people would learn the value of rational hygiene, and the severe infectious diseases could be more readily controlled. It is a sign of a defective understanding of the importance of hygiene to believe that "children must have certain diseases." It is not necessary. Sickness is really due to ignorance in its truest sense.

GINGER (ZINGIBER).—The scalded and dried rhizome of the ginger-plant, *Zingiber officinale*, a perennial or biennial creeper indigenous to India and Jamaica. The rootlets are from one to four inches long, light ashen-gray externally, yellowish-white and fleshy internally, yielding a yellowish-brown powder. The Jamaica variety is called "white ginger," because the rootlets, being deprived of covering, are white or pale yellow on the outside. The powder also is lighter than that of the Indian variety. Ginger has an agreeable aromatic odor, and a spicy, pungent, and burning taste. The peculiar flavor is dependent upon the presence of a volatile oil, which may be extracted by alcohol or water.

Ginger is used as a stimulant in weakened conditions of the alimentary canal, such as dyspepsia, flatulence, etc. It is also frequently used as a vehicle for disagreeable drugs. When the root is chewed it irritates the mucous membrane of the mouth, and increases the flow of saliva. Applied externally to the skin, it acts as a blistering agent, causing redness. The dose of powdered ginger is from ten to thirty grains; of the infusion (made by adding one ounce of powdered ginger to a quart of boiling water), one or two ounces. The tincture of ginger is given in teaspoonful doses.

GLANDERS.—A highly infectious bacterial disease occurring principally in horses, donkeys, and mules; rarely in sheep, goats, and cats. The disease is occasionally transmitted from these animals to man. The entrance of the bacillus of glanders into the human body usually takes place through the mucous membranes of the respiratory passages, but may be transmitted also through the healthy skin. It occurs most frequently in soldiers (especially cavalrymen), hostlers, drivers, farmers, etc. In cases where infection has taken place through the skin, the disease begins with pain, redness, and swelling of the infected part and of the neighboring lymph-channels,

and with the formation of crusts, the decay of which causes extensive ulceration. If the infection has been transmitted through the nose, the latter swells, becomes red, and secretes a thin, purulent or bloody, often fetid fluid. The progress of the disease leads to ulcers in the mouth, pharynx, larynx, bronchi, and lungs; and a general infection of the body may take place.

The symptoms of a general infection consist in gradually increasing high fever with violent chills, hoarseness, cough with mucopurulent (often bloody) discharge, swellings of the joints, numerous ulcers of the skin, headache, delirium, and stupor. In acute cases the duration of this extremely dangerous malady is a few weeks, but it may extend over months and years. If proper treatment is not begun at the very onset of the disease, death usually terminates the sufferings of the patient. The necessity for all persons who come in contact with sick horses to exercise extreme caution is thus illustrated.

GLASS EYE.—An artificial eye which serves to take the place of an eye that has been lost. It is shaped like a little bowl, and is curved to fit over the rounded remains of the eye, and colored to imitate the natural organ as closely as possible. The materials employed are glass, enamel, or porcelain. An artificial eye is useful from the cosmetic as well as from the hygienic point of view. It supports the eyelids and prevents their becoming inverted, thus avoiding inflammations in consequence of friction of the eyelashes. The first artificial eyes were made by a Frenchman, Poissonceau, who in 1850 was followed by one Müller in Lauscha, Germany. Artificial eyes can now be obtained almost everywhere.

GLAUCOMA.—An internal disease of the eye, which is characterized by an increasing sensation of pressure in the organ, and by the appearance of a peculiar change in the eye-ground, which, however, can be seen only with the aid of the ophthalmoscope. Severe pain is present, combined with the illusion of haze and of rainbow colors. Owing to internal changes the eye becomes useless unless an operation, which consists in the removal of a portion of the iris, is resorted to in time. Drops of atropin should never be used in this condition. The sight has often been irreparably damaged through neglect of this precaution.

GLEET.—See GONORRHEA.

GLOTTIS, SPASM OF.—A spasmodic condition of the diaphragm and of those muscles which move the vocal cords. It occurs chiefly in patients suffering from a pronounced or hidden attack of rickets, and principally during the months of January, February, and March. It is a very dangerous disease, as it attacks young children of three months to two years of age, sometimes affecting all the children of a family. The attack comes on without warning, and is usually caused by sudden excitement or great fright. The child at first makes eager attempts to breathe, then stops

breathing altogether, and stands with the mouth wide open and with the head thrown backward. The face turns purple, the veins of the head swell and protrude, and the eyes stare vacantly into space or roll heavily from side to side. In some cases there are spasmodic movements of the arms and legs, clenching of the hands, and distortion of the face, followed at times by involuntary passing of urine and feces. After being breathless for about half a minute the child makes several whistling inhalations, whereupon it revives unless another seizure sets in. If the spasm ceases, the child recovers quickly, is able to breathe as before, and the color of the skin becomes normal. Some children are cross and sleepy after an attack, others are as cheerful as usual. At times the tongue rolls back during an attack, closes up the passage of the glottis, and causes death by suffocation.

If some children of a family have had these attacks, it is wise to try and ward them off in the younger children by letting them have plenty of pure air to breathe, and the food best suited to their ages; mother's milk is preferable. Every disturbance of digestion is to be carefully warded off or controlled. During an attack, the child's clothing should be loosened, a hot sponge applied to the larynx, and cold water sprinkled over its face. Pressure of the finger on the roof of the tongue or on the epiglottis will often stimulate the breathing. A child who has a spasm of the vocal cords must be treated by a physician, and needs the greatest care and attention. One of the most useful modes of treatment calculated to increase the resistance of these children is the daily sponge bath. In the severe cases the patients should be given a warm bath two or three times a day; and at the close of the bath the chest, neck, head, and spine should be sponged off with cold water. Cod-liver oil is useful in these cases. Particular care must be taken by the mother that the dangerous true croup, or laryngeal diphtheria, is not confused with this comparatively mild affection.

GLUCOSE.—A mixture of several forms of sugars more or less closely related, and at the present time largely manufactured from starch by the action of sulfuric acid. Glucose is a very readily digested food, being sweet, and possessing the advantages of ready solubility and agreeable taste. It is not as sweet as cane-sugar, and some of the commercial forms, because of slovenly methods of manufacture, contain traces of acid and other impurities. For the most part, however, glucose is a perfectly harmless article, and not the vile adulterant that is harped upon by hysterical food reformers.

GLYCERIN.—A sweet, soluble liquid, obtained from fats and fixed oils by the action of caustics. It is most frequently obtained as a by-product in the manufacture of soaps. Pure glycerin should be colorless and odorless, extremely viscid, hygroscopic, and sweet to the taste. Exposed to the air it absorbs moisture, and applied to the skin abstracts water from the tissues. Taken internally it slightly irritates the stomach and

intestines, causing diarrhea; and used in the form of suppositories it may be useful in relieving constipation. Solutions of glycerin and water with the addition of alcohol and various aromatics are widely employed as applications to the mouth and lips, especially in conditions of fever. The excessive use of glycerin leads to chapped hands, cracked lips, and much discomfort, as it has the property of absorbing water from the mucous membranes, leaving these structures cracked and irregular. Medicinal preparations made with glycerin are termed glycerites.

GLYCYRRHIZA (LICORICE).—The dried root of *Glycyrrhiza glabra* and other species of *Glycyrrhiza*, shrubs native to southern Europe, southwestern Asia, Persia, and surrounding countries. The greater portion of the licorice imported into the United States is the so-called Spanish licorice. Licorice contains a small percentage of volatile oil, and large quantities of sugar, gum, and woody residue. It has a peculiar characteristic taste, and is extensively used to disguise the flavor of other remedies. Of itself it has very little action. It is thought to give a mild laxative effect, but compound licorice powder, in which it is used in large quantities, is laxative because of the senna it contains rather than because of the licorice. Large quantities of the ordinary licorice are laxative because of the sugar contained in this confection.

GOITER.—An enlargement of the thyroid gland, which is situated in the front part of the throat, immediately below the larynx (see Plate IV. 19).



FIG. 144. Goiter.

Large goiters are greatly disfiguring because of their exposed position (see Fig. 144). This, however, is not the only disadvantage of the condition. Many patients afflicted with goiter suffer from shortness of breath; they are unable to lie flat on their back in bed; and rapid walking and climbing of stairs is disagreeable to them. In many cases attacks of suffocation may occur. The presence of goiters constitutes a single symptom only in certain diseases, as in **EXOPHTHALMIC GOITER** (which see). Other goiters may become malignant; as,

for instance, in cancer of the thyroid gland.

In mild cases, and in those accompanied by only slight disturbance, goiter is treated with inunctions and internal remedies. If the goiter causes serious disturbances, or if it is very disfiguring, operative removal is indicated. Its removal is imperative if it is cancerous. The operation for the

removal of goiter was formerly considered very dangerous. At the present time, however, owing to the refinements in technic, it is a comparatively safe procedure. It can be designated as dangerous only in exophthalmic goiter, and in cancer. In both cases, however, the danger is because of the disease, and not by reason of the operation. The operator should never remove the entire thyroid gland, but should always allow a portion to remain intact; for experience has taught that the entire gland can not be spared by the body. If it is completely removed, a condition develops which will be found described in detail in the article **THYROID GLAND, DISEASES OF.**

GONORRHEA.—Contagious catarrh of the urethra; vulgarly called "clap." This is a very wide-spread disease, a "disease of the masses," which is found among an alarming number of patients, especially among the youths of large cities. It is not an exaggeration to state that the public and private prostitutes of a great city are almost without exception thus infected. It is greatly to be regretted that many of the young men suffering from gonorrhea are never thoroughly cured, because of inadequate treatment of the first, or of subsequent attacks. It sometimes happens that this disease develops with barely any accompanying symptoms, or at least without much annoyance to the patient. The disease may exist in a latent condition for years, the patient meanwhile considering himself perfectly well. These latent forms of gonorrhea in young men are a grave social danger, for they are the means of spreading the contagion further and further, and sad experience teaches that thousands upon thousands of young, innocent women become infected by their husbands.

In women the disease runs a very slow course, is difficult to recognize in its early stages, and shows a tendency to attack the internal female sexual organs and their neighboring parts. These inflammatory abdominal conditions may cause serious impairment of the general health, and influence the power of conception. Furthermore, in most cases gonorrhea in women must be regarded as incurable, or removable only by energetic, dangerous operations (castration) which often cause sterility. All these results make it to be earnestly hoped that finally the public in general will learn to appreciate more fully the dangers arising from gonorrhea, not only for the individual, but for the public at large as well; and that instead of regarding the victims as targets for cheap wit, they will be considered as subjects greatly in need of medical attendance. As in syphilis, individual and general modes of prevention must be directed toward a reduction in the number of infected persons; a result which can be achieved only when the prevalent ideas of sexual conditions have become thoroughly changed. Such a change can only take place if the prudery and false morality of the day is overcome, and makes way for the fundamental principles of true humanity.

Gonorrhea appears differently in the two sexes. In the male it generally manifests itself after several hours or a few days by a pricking sensation in the end of the penis. The urine burns as it passes out, and is later followed by a thin, fluid secretion which gradually turns purulent. This pus may at first be scanty, or it may be very profuse. Urination becomes more and more painful, as does also erection. The latter condition is often accompanied by considerable swelling of the meatus of the urethra, at times of the entire organ, or of the glans and foreskin. These painful inflammations become more severe and persist at a certain height until the third week; then the discharge again becomes gradually mucopurulent, then mucoid, and soon disappears entirely. In an uninterrupted cure, the disease is conquered usually in six to eight weeks. If the disease, as often happens, is insidious, there remains a scant secretion of mucus for weeks, months, and even years. These lasting mucous discharges may be contagious, but are not always so. This point can be decided by the physician only after repeated microscopical examinations of the discharges or of the "threads," found especially in the morning urine. A material delay in the cure, and a change of prognosis regarding the issue, is conditioned by a number of possible accidents. The most usual complications are: Inflammation of the epididymis (see EPIDIDYMITIS); inflammation of one or both testicles, at times causing the affected testicles to become functionless (see ORCHITIS); inflammation of the lymphatic glands and the lymph-channels (see BUBO); inflammation of the prostate (see PROSTATITIS); and inflammation of the neck of the bladder or of the bladder itself (see CYSTITIS). Late consequences of an insidious gonorrhea are contractions of the urethra (see STRICTURE) and, in rare cases, the spread of the infection to internal organs. Inflammation of the iris, and gonorrheal rheumatism may be mentioned as possible results of such infection. The results may be very dangerous, conditioned by the importance of the organ affected. In all cases, any additional disease which may occur will cause considerable delay in the cure.

In the female there are fewer urinary symptoms, unless by chance the disease invades the urethra. The discharge (at first scanty, but gradually increasing in quantity) is usually regarded as a harmless leucorrhea; and not until the disease has progressed upward to the internal sexual parts does a copious mucous discharge appear. Usually the disease progresses from the womb to the tubes and ovaries. Then collections of pus take place in the tubes, with limited peritoneal exudations and adhesions; and these in turn cause lasting inflammatory conditions which can be cured only by operation. The insignificance of the early symptoms, and the absolute ignorance of many women of the possibility of such a disease, readily explain the delay in treatment; and it generally requires some persuasion to influence a girl or a woman to submit to an examination. Whenever

symptoms of a mucous or purulent discharge from the vagina, difficulty in urination, or pains in the abdomen, occur shortly after marriage, it is advisable that a thorough examination be made, and that attention be paid to the possibility of gonorrhea being present. The husband should be examined also, especially if he had suffered from gonorrhea before marriage. The sooner the treatment is begun (of both parties, if necessary), the more lasting will be the results obtained. With women, as with men, complications are common. Cystitis, vaginitis, and cervical erosions are not unusual. In women the contagious inflammation frequently comes in contact with the vaginal discharge, spreads to the anus, and causes gonorrhea of the rectum. In such cases evacuation of the bowels becomes exceedingly painful.

The eye is always endangered by contact with gonorrheal discharge. The purulent inflammation which results is always very severe, and may lead to total destruction of the eye (see EYE, DISEASES OF). It is therefore necessary that persons suffering from gonorrhea should wash the hands most scrupulously after treating the parts (injections, etc.), and avoid every possibility of the eye coming in contact with the discharge (from soiled linen or bandages). Contagion is produced most frequently by sexual intercourse. There are, however, cases of non-sexual contagion. Sponges, soiled wash, and towels may convey a gonorrhea to little girls.

For the prevention of contagion, stress must be laid on the importance of great cleanliness both before and after coition. In addition, the use of a condom is advisable; this is an artificial protective which, if of good quality and properly applied, will protect the sexual parts of both persons. As an additional protection for young men from contagions resulting from prostitution, some drops of a two per cent. solution of nitrate of silver may be instilled into the opening of the urethra immediately after intercourse.

As to the treatment, it may be said that after the first twelve to twenty-four hours, washing out the anterior urethra with bactericidal remedies (to be done only by a physician) is at times efficacious in preventing an outbreak of the disease. Later this treatment is of no value, and the condition must then be handled according to the severity of the inflammation. Therapeutic treatment lies entirely in the hands of the physician; it is very unwise to try the remedies used by another person, for there is no one cure for all cases, and medical treatment is conditioned by the symptoms in each case. It is imperative that a patient suffering from gonorrhea should adopt a sensible mode of life, and avoid bodily exertion, sexual excitement, and alcoholic drinks. Carelessness in this regard is just as wrong as prejudice against medical treatment (particularly injections), for the latter naturally aids the progress of the cure. The fear that the suppression of the urethral discharge caused by the injections may lead to internal diseases, must be rejected, as it is based upon wrong impressions. It goes without saying that quacks should not be allowed to treat such a serious disease.

Such persons generally regard the patient as an object of profit rather than some one needing careful treatment. Young men are ruined for life by quacks. Some quacks have been known to cause gonorrhea to last for a long time.

The wide-spread view that gonorrhea may be caused by intercourse with a woman who has leucorrhea, is erroneous; as is also the belief that it can be caused by intercourse during, or immediately before or after, menstruation. Another wide-spread, remarkable belief, that gonorrhea may be cured by intercourse with a virgin, or with a pregnant woman, is nothing

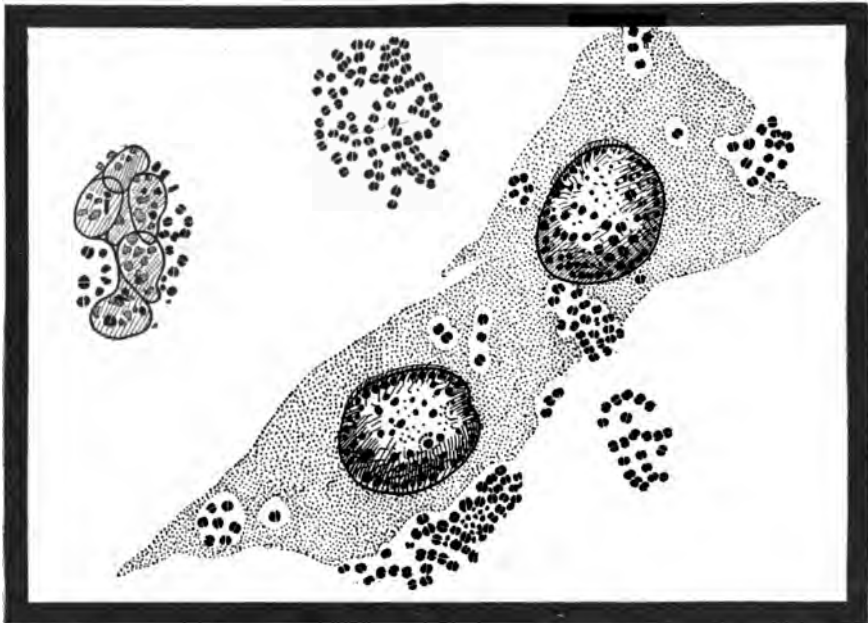


FIG. 145. The bacteria (gonococci) which cause gonorrhea.

less than criminal. It is hardly necessary to oppose such a ridiculous superstition; it suffices to recognize it as such, and to call attention to the dangers which result from such a belief.

The opinion expressed by certain "nature doctors," that in gonorrhea the inflammation primarily localizes itself just posterior to the glans, is quite correct, inasmuch as the first seat of the disease is in the anterior part of the male urethra. But the belief, that in consequence of injections (which according to "nature doctors" is an incorrect treatment) the disease spreads over the entire urethra, is incorrect. The condition will spread when this mode of treatment has failed to suppress it at the very beginning. This is the natural course of the disease, which no method or "nature cure" can change. The seemingly brilliant results that some quacks achieve with various methods, whether injections play a part or not, is explained in

the following way: There are many persons who suffer from latent gonorrhea, and whose condition is now and then aggravated by certain harmful proceedings, such as sexual irritation, and overindulgence in alcoholic drinks. The symptoms of this condition will naturally disappear with a more careful way of living. Such cases, though far from being cured, are looked upon as cured, and pronounced as such, by persons who have no knowledge of these conditions. Herein also lies a refutation of the supposition always brought forward by quacks and "nature doctors," that men may acquire gonorrhea in intercourse with absolutely healthy women. Such are likewise cases of latent gonorrhea, but by claiming the infection to have come from a woman, well known to be healthy, the affected person puts a load off his conscience. (The bacteria which cause gonorrhea are known as *Gonococci*; see Fig. 145.)

GOSSYPIUM (COTTON-ROOT).—The bark of the cotton-root is used extensively in the southern states, particularly by the negroes, because of its effect in stimulating the intestines and uterus. Much of the extract of cotton-root bark is inactive, which has led to the idea that the root contains no medicinal principle; but fresh specimens show a marked stimulating action on the uterus.

GOUT.—A disease of nutrition. Its causes are not all known, and there is much uncertainty about what is known; but there is usually an excess of uric acid bodies (purin bases) circulating in the blood, and attacks of inflammation in the small joints occur with general constitutional disturbances. Uric acid and its combinations (purin bodies) represent, as it were, a portion of the ashes which result from the breaking down of the proteids of the body or of the food. Under normal conditions these are excreted from the body through the kidneys, as urea, and uric acid, etc.; in smaller quantities also through the sweat-glands. Proteid (albumen) is ingested with the food; as with meat, fish, eggs, cheese, milk, bread, and legumes. The ingested proteid is necessary to replace that constantly being used by the body in the heart-beat, and in the acts of walking, thinking, talking, etc. Circulating in the blood, the proteids are burned, in contact with oxygen, and they are thus partly the source of the energy of the living body. It has been held that so long as the one product of metabolism, uric acid, is excreted regularly and in sufficient quantities, it is impossible to become affected by gout. This, however, is only part of the truth; not all.

The defect may be twofold: either the proteids are not properly oxidized; or perhaps the fault is in the elimination. Thus, if the quantity of uric acid bodies present in the blood increases, or if their excretion becomes faulty, these salts begin to precipitate in the different tissues, cartilages, and organs. If the deposits occur at the surface of the body, they form the well-known gout-stones. These are found, among other places, in the cartilages of the ear, in the joints of the fingers, and with special predilection in the joint of

the great toe (*podagra*). These deposits may give rise to severe pains, and, probably because of mechanical reasons, they generally lead to violent inflammations; or they may give rise to no such manifestations, the appearance of gout-stones being the only warning given. Just as the deposits occur externally, so they may take place in the interior of the body, where, according to their location, they cause various disease symptoms. For instance, many an attack of tracheal catarrh or of migraine may be due solely to these deposits. That variations in proteid metabolism cause the various forms of gout is practically all that is known with certainty regarding these morbid processes.

However insufficient the positive knowledge may be concerning this disease, the statements made will convince even the layman that it is necessary to diminish the ingestion of all foodstuffs which contain proteids. This, of course, does not take cognizance of what is probably of most importance: that the defect is one of the body, and not due to any excess of food. Thus, the older school of physicians insisted that all proteid diet be excluded in the very severe cases, allowing only milk in small amounts. Alcohol is subject to the same exclusion. It has been ascertained beyond doubt that alcoholic liquors favor attacks of gout; indeed that gout may be the unpleasant receipt for sins committed by the abuse of alcoholic drinks. It therefore becomes the indispensable duty of the patient to abstain from alcohol, and to quench his thirst by drinking fruit-juices and lemonades in place of beer and wine, as may have been his custom previously. The effects of alcohol in this disease are difficult of explanation, and offer a serious obstacle to the acceptance of the "uric acid theory."

As to the diet, fruits are allowable. They may be combined with vegetables, such as potatoes, radishes, and lettuce; the last-named, however should preferably be prepared with lemon-juice. The food should be only moderately seasoned and spiced, and the patient will surely find out that it is to his own advantage if he observes a general moderation in eating. It is probably beyond question that an exaggerated enjoyment of the products of the culinary art favors the development of gout, if for no other reason than for the increased ingestion of proteid substances.

It should not be forgotten that the poor also may be affected by gout. Heredity is an important factor, and the children of gouty parents should be careful in their mode of living, particularly with reference to alcoholic drinks, port, and malted liquors. The following requirements, which must be met in order to prevent the occurrence of gout, are commendable also for other reasons, and are not difficult to carry out. (1) A great deal of fruits should be eaten every day, and moderation should be observed in the use of fish, meat, cheese, etc. (2) Plenty of daily physical exercise should be taken, such as walking, gymnastics, etc. (3) Alcoholic drinks should be used with great caution. As a rule, most people eat too much meat and get

far too little exercise. It is therefore not astonishing that the overabundant and surfeited blood, together with inactive metabolism, lead to morbid manifestations; and that exaggeration on the one hand and neglect on the other bring about their sad consequences. The occurrence of gout in consequence of chronic lead-poisoning is of greater interest to the physician than to the layman.

GRANATUM.—See POMEGRANATE.

GRAPE-CURE.—The great amount of sugar present in southern grapes makes them, in sensible combination with other articles of nourishment, a splendid food for patients who are anemic, weak, or convalescent. This cure is especially indicated for cases in which it is desirable to obtain the effect of the watery constituent of the grapes, and of their acids. In cases of hemorrhoidal and digestive disturbances grapes are often more curative, and certainly more pleasant, than mineral waters. The patient should eat about five pounds of grapes daily, not more; and this quantity should be divided so that one half is taken in the morning before breakfast, and the other half in two or three portions during the day. The skins and stones must not be swallowed. While taking a grape-cure, the patient should avoid acid or fatty foods, beer, rye-bread, etc.

GRAVES' DISEASE.—See EXOPHTHALMIC GOITER.

GRAY HAIR.—See HAIR, CARE OF.

GRINDELIA.—The dried leaves and flowering tops of *Grindelia robusta*, a plant native to the western portion of the United States, and introduced into medicine as a mild bitter, a tonic, and an expectorant. It has a distinct action in diminishing the spasmodic activity of the bronchi, and has been of use in the treatment of whooping-cough and subacute bronchitis.

GRIPPE.—See INFLUENZA.

GROWTH.—The gradual development to maturity. It has always been customary to divide the life of man into seven ages of seven years each. Childhood includes the first seven years; puberty brings us to the fourteenth year; and at the age of twenty-one man has left youth behind him and has arrived at the end of his growth. These three periods are so characteristic and so marked, that even Roman legislation took them into consideration. Also the later periods are noteworthy. At forty-two man has reached the middle of life, and from this time, although the mental faculties may continue to develop, the bodily strength gradually declines. In women fertility ceases. The seventieth year may be considered the beginning of the senile period. Naturally there are exceptions. In many cases it may not be said to have set in even at this time, but as a rule it commences at a much earlier period.

Of greatest importance are the first three periods. By the seventh year the actual growth of the brain is practically completed, and thenceforth it merely becomes more and more perfect in development. The dentition

also undergoes a change about this time, and may result in a variety of nervous disturbances. Puberty is manifested about the fourteenth year, coming on somewhat earlier in girls than in boys, and is marked by a growth of hair on the chin, the pubes, and the axillæ, and by the appearance of menstruation in the female and the discharge of semen in the male. Nervous disturbances may set in during the period of sexual development. The change which takes place in the voice at the time of puberty is especially marked in boys. The larynx grows and the vocal cords increase with about one-third of their original length. The laryngeal muscles, however, do not keep pace with this rapid growth; and as a result the loss of complete control brings about the sudden changes in speech which are recognized as a "cracked voice." Restoration takes place slowly, and during this time all attempts at singing should be avoided. The twenty-first year finally marks the completion, and the attainment of full physical growth.

GUAIAIC.—The heart-wood of *Guaiacum officinale*, obtained from small trees of Central and South America and the West Indies. Its chief constituents are resinous principles of undetermined composition. Guaiac has been extensively used in the treatment of blood disorders, but has fallen out of favor for these diseases. It has a certain vogue in the treatment of tonsillitis, but its use in medicine is diminishing rapidly. It is very serviceable in a chemical test for the detection of blood in human secretions.

GUAIACOL.—One of the chief constituents of creosote, from which substance it differs but slightly in its action. It is not as irritating, however, and has not such a persistent taste nor odor. It is used in much the same manner and for the same purposes as CREOSOTE (which see).

GUARANA.—This is a dried paste, obtained from the crushed seeds of *Paullinia cupana*, a plant native to Brazil and contiguous countries. Guarana contains at least five per cent. caffeine, and is extensively employed as a drink for much the same purposes as tea and coffee. It also contains tannic acid, wherefore it combines astringent properties with the stimulating qualities due to the caffeine.

GUINEA-WORM.—See FILARIA.

GULLET, DISEASES OF.—See ESOPHAGUS, DISEASES OF.

GYMNASTICS.—A form of exercise which tends to give the body a uniform development. It is usually taught in gymnasiums or on gymnastic grounds, for the majority of the exercises require special apparatus which make the exercises more varied and more difficult to execute. If properly selected, these exercises will always accomplish the desired result: the uniform development of the body. Gymnastic exercises may be taken in summer as well as in winter, and in all kinds of weather. As a continuous pursuit they are therefore to be preferred to any other form of bodily exercise. They are especially valuable for persons who follow

sedentary occupations, and who have but little leisure, and not much money to spend on recreation.

Grown persons who practise gymnastics for the first time, or after a long interval, should begin with very easy exercises in order to avoid exhaustion, pain in the limbs, and increased body temperature. This condition, however, is by no means dangerous, and generally subsides after a few days. The feverish condition which sometimes follows vigorous gymnastic exercises is due to the circumstance that the lactic acid produced by the muscle activity is not thrown off by the body in sufficient



FIG. 146. Bending the head forward and backward.



FIG. 147. Inclining the head to the right and left alternately.

quantity. After the exercises have been performed a few times the circulation of the blood becomes more vigorous, and rise in temperature does not reappear. In children whose circulation is otherwise undisturbed no rise in temperature will result from the gymnastic exercises.

I. Curative Gymnastics.—Under this name are included a number of systematically arranged bodily exercises which should be undertaken by patients to improve or to cure existing ailments; or by the healthy to exert a favorable influence upon temporary conditions which, although not morbid in character, make special demands upon the body (as for instance, during pregnancy). Some of these exercises can be practised by the patients alone; others only with the assistance of another person, or with special apparatus and machines. According to their different forms, the exercises are classified as *Nerve Gymnastics*, *Swedish Gymnastics*, *Respiration Gymnastics*, *Orthopedic Gymnastics*, and *Home Gymnastics*. The last-named exercises form a transition to the gymnastics of the healthy, as they are prac-

tised, not by the diseased only, but by healthy individuals who wish to prevent a weakening of the body, but who have neither the inclination nor the opportunity to practise any other form of physical exercise. Curative gymnastics are often recommended to patients in order to assist in other cures. It is not advisable for a patient, however, to practise these exercises until the latter half of the period of convalescence, when he has recovered a certain degree of his strength. Since curative gymnastics are perfected to the smallest details, they should be prescribed by the physician according to a well-conceived plan, adapted to the requirements of each individual patient.



FIG. 148. Rotary movement of the head.



FIG. 149. Turning the head.

Before undertaking gymnastic exercises it is necessary to observe a number of instructions. In the first place, it is important to select the proper time of the day. As one daily exercise is sufficient, it is best to select the late forenoon. The early morning, immediately after rising, should be used only by strong persons. If it is desired to repeat the exercises, the late afternoon hours should be selected for this purpose. Many individuals who suffer from insomnia are fond of practising gymnastic exercises shortly before retiring. The times recommended prevent conflict with the meal hours; for it is a very old rule that no gymnastic exercises should be performed until one or two hours after a hearty meal. There is no harm, however, in taking a light lunch, a cup of bouillon or tea, before an exercise. It is obvious that comfortable clothing should be worn, and that all tight and close-fitting garments should be removed (the corset by women; the starched shirt by men). The patient must avoid physical and mental exertions immediately before practising. Absolute rest of the mind must

be insisted upon also during the exercises. Conversation or reading during the intervals is prohibited.

After the exercises it is desirable that the patient rest for some length of time; weak patients should lie down for half an hour. No meal should be taken until half an hour or an hour after. The regular practise of the gymnastic exercises is of importance. During the entire time of the cure the patient is not permitted to undergo any great exertions, nor to keep late hours. The hour of the day decided upon for the exercises must be strictly adhered to. At the beginning the physician will explain to the patient that



FIG. 150. Raising the arms forward.



FIG. 151. Raising the arms laterally.

a material improvement can not be noticed until a month has passed, and that only perseverance and endurance will lead to the desired end.

For healthy persons, or for those who are but slightly indisposed, and to whom the physician leaves the selection of the gymnastics, the following suitable house exercises are of value.

Movements of the Head.—These are advisable only for the young; older people are liable to become affected with vertigo by practising them.

(1) Bending the head forward and backward (Fig. 146).—The head is bent forward slowly (not by jerks) until the chin eventually touches the chest. After remaining in this position for a few moments, the head is brought back into the upright attitude. The upper part of the body, especially the shoulders, should not participate in this movement; this applies particularly to the trunk, which must be kept quite straight. When bending the head backward, which is performed in the same manner, one should not attempt to speak or swallow. It is best to hold the breath.

(2) Inclining the head to the left and to the right (Fig. 147).—This exercise is performed in the same manner as the preceding, only that the head is bent sideways instead of forward and backward. A combination of these four movements results in the next exercise.

(3) The rotary movement of the head (Fig. 148).—The movement is made alternately toward the right and toward the left. The circle is described by first bending the head forward and then, without raising the face, turning it toward the right laterally until the cheek touches the shoulder; the movement continues backward and toward the left until the left cheek



FIG. 152. Bending the arms.



FIG. 153. How to grasp the wand.

touches the left shoulder, when the head is again brought forward to the first position. The circle is then repeated toward the left side in a similar manner. The attitude of the trunk should be exactly as in exercise 1.

(4) Turning the head (Fig. 149).—While keeping the body erect, the head is turned toward the left and right alternately, in such a manner that the chin almost touches the front part of the shoulder.

The exercises mentioned thus far are rendered possible by the rotation of the first cervical vertebra, the *atlas* (see p. 31). It is practical in these four exercises to place the hands upon the hips. After each of these movements has been practised from two to six times, about five deep inspirations should be made. These exercises of the head strengthen the muscles of the neck and of the nape, and the joints of the cervical vertebræ become more free and movable. If there is weakness or partial paralysis of these muscles, combined with habitual faulty attitudes of the head (for instance,

inclination of the head to one side), these exercises are advisable, and should be made to one or to both sides as the case may require.

Movements of the Shoulder-girdle and of the Arms.—A number of exercises belonging under this category will be found in the paragraphs on *Respiratory Gymnastics* (see Figs. 191-198).

(1) Raising the arms forward, with or without clenched hands.—In the original attitude the arms hang down. From this attitude they are stretched and raised forward during inspiration, held for a few seconds in the position



FIG. 154. Upward stretching of wand.



FIG. 155. Turning the wand above the head.

shown in Fig. 150, and then lowered during expiration. The exercise may be repeated from three to fifteen times.

(2) Raising the arms laterally, with or without clenched hands (Fig. 151).—This exercise is executed in the same manner as the preceding one, and may likewise be repeated from three to fifteen times.

(3) Raising the arms, with or without the hands clenched (compare Fig. 193).—Inspiration should be made on raising, expiration on lowering the arms. The method of practise is as in the two previous exercises. This should be repeated from two to ten times.

(4) Bending the arms, with or without clenched hands (Fig. 152).—The suspended arms are bent at the elbow-joint, and then brought upward in front of the shoulders or breast, the patient making an inspiration at the same time. After remaining in this position for a few seconds, the arms are lowered into the original attitude, with simultaneous expiration. This exercise is to be repeated from three to fifteen times.

(5) Thrusting the arms forward.—This exercise may be done (*a*) either alternately, or (*b*) with both arms simultaneously (compare Fig. 196); or it may be made (*c*) by alternately bending the left arm and thrusting forth the right, and thrusting forth the left and bending the right. Exercise *a* should be practised ten times; *b*, six times; *c*, four times. From the attitude in Fig. 152, the arms are stretched by being thrust forward, either singly or simultaneously, during the act of expiration; this position is held for a few seconds, when the original posture is again assumed by bending the arms during inspiration.

(6-8) Thrusting the arms sideways (6), upward (7), downward and backward (8).—To be executed as exercise 5. Inspiration is necessary



FIG. 156. Lowering the wand backward.



FIG. 157. Lowering the wand backward, stretching the arms.

when thrusting the arms sideways and upward; expiration when bending them. In exercise 8, however, expiration must accompany the thrust; inspiration, the act of bending.

Exercises with the Wand.—The original attitude (9) is shown in Fig. 153. The wand should be grasped so that it can be held comfortably in front of the body.

(10) Bending the arms with wand in front of the chest (compare Fig. 152).—The wand is held in this position for a few seconds, and is then again lowered. To be repeated from ten to twenty times.

(11) Upward stretching of the wand (Fig. 154).—This attitude may be assumed either by thrusting the wand vertically upward after having selected exercise 10 as original position; or, beginning with the attitude

shown in Fig. 153, by raising the wand with the arms stretched, first forward and then upward. Inspiration must be made during the upward movement, expiration to follow during the return into the original attitude chosen. Repeat from six to twelve times.



FIG. 158. Swinging the wand sideways.

(12) Twisting the wand over the head.—

This exercise is commenced by stretching the wand upward as in No. 11, during the act of inspiration; from the attitude in Fig. 154, the wand passes into that shown in Fig. 155 by crossing the arms over the head and twisting the wand in the horizontal plane, grasping it quite loosely and with the hands a little closer together than shown in Fig. 154; this is followed by an expiration. After remaining for several seconds in this position, the attitude in Fig. 154 is resumed during an inspiration; whereupon the wand is returned to the original attitude selected. Four to eight times.

(13) Lowering the wand backward, down to the nape of the neck.—Begin with exercise 9; follow this up with exercise 11 (Fig. 154);

and then lower the wand behind the head until it rests upon the nape of the neck (Fig. 156), these movements to be accompanied with an expiration. Take an inspiration while stretching the wand upward, and then return to the original attitude during expiration. Six to eight times.

(14) Lowering the wand backward, with stretching of the arms.—From the attitude in Fig. 154 the wand is lowered behind the head until attitude 156 is reached; whereupon both arms are brought almost simultaneously into the attitude represented in Fig. 157 by thrusting both arms downward in rapid succession. This movement is made during expiration, inspiration taking place during the return into the original attitude (Fig. 154). Three to eight times.



FIG. 159. Lowering the wand to the side.

(15) Swinging the wand to the side.—From the horizontal position (Fig. 153) the wand is swung into the vertical attitude on the left side of the body (Fig. 158), the right arm being bent transversely in front of the body, and the



FIG. 160. Bending the hand backward and forward.



FIG. 161. Exercise for the palm of the hand.



FIG. 162. Exercise for the palm of the hand.



FIGS. 163, 164. Finger exercises.



FIGS. 165, 166. Finger exercises



FIG. 167. Bending the trunk forward.



FIG. 168. Straddle position, with hands resting on hips.



FIG. 169. Bending the trunk backward with raised arms.



FIG. 170. Bending the trunk sideways.

left arm stretched upward. From this attitude the wand is again stretched into the horizontal position, whereupon it is swung into the vertical attitude on the right side. Inspiration should take place during the raising of the wand. Eight to twelve times.

(16) Lowering the wand to the side (Fig. 159).—The wand is raised high as shown in Fig. 154, and then lowered to the left side so that the right arm is bent over the head, and the left arm extended downward. Then the wand is again stretched upward, and lowered to the vertical position on the



FIG. 171. Rotary movement of the trunk.



FIG. 172. Turning the trunk, the arms being extended.

other side. Both exercises should be made alternately about four to eight times.

The sixteen exercises described in the foregoing tend to strengthen the muscles of the chest, of the arms, and of the back. They exert a favorable influence upon respiration, and therefore indirectly upon the heart. They are especially indicated in persons with flat or weak chests, with faulty attitude of the body, and with lateral curvature of the spinal column.

Exercises of the Hands and Fingers.—Hand and finger exercises, of which only a few illustrations are given, are indicated for patients with cold fingers. They are especially applicable in writer's cramp.

(1) Bending the hand backward and forward (Fig. 160).—This exercise should be repeated from six to ten times. Weak patients should support the forearm during the exercise so that the hand preserves its freedom of motion; stronger patients hold the arm unsupported, either extended or bent.

(2-3) Exercises for the palm of the hand.—Figs. 161 and 162 illustrate



FIG. 173. Raising the legs sidewise.



FIG. 175. Raising the legs backward.



FIG. 174. Raising the legs forward.



FIG. 176. Rotary movement of thigh.

how to perform these movements. No. 2 (Fig. 161) should be made from three to ten times; No. 3 (Fig. 162), five to fifteen times.

(4-7) **Finger exercises.**—The various finger movements are illustrated in Figs. 163-166. The exercise shown in Fig. 163 should be made three to ten times; that of Fig. 165, five to fifteen times; that of Fig. 164, three to ten times; and that shown in Fig. 166, five to twenty times.

Movements of the Trunk.—These movements are executed principally by the raising and lowering of the pelvic girdle, with participation of the spinal column.

(1) **Bending the trunk forward.**—This may be done either with the hands resting on the hips, or with forward swinging of both arms, as if



FIG. 177. Raising the knee.



FIG. 178. Stretching the leg.

intending to support the hands upon the floor (Fig. 167). In these exercises it is best to spread the feet apart in straddle fashion (see Fig. 168). Expiration should accompany the bending; inspiration, the straightening of the body. Repeat from three to eight times.

(2) **Bending the trunk backward, swinging the arms upward and backward** (Fig. 169).—This exercise may be repeated from three to eight times; it is best to hold the breath while performing the movements.

(3) **A combination exercise.**—Exercises 1 and 2 are practised alternately in such a manner that the movements resemble those made in chopping wood. Two to six times.

(4) **Bending the trunk sideways.**—This is done to the right and left alternately, while supporting the hands upon the hips (Fig. 170). Six to twelve times.

(5) Rotary movement of the trunk.—This is a combination of the four previous exercises. It is best to begin with the arms raised; from this attitude the rotary movements are executed by bending the trunk to the left, and then go through the same movements to the right, letting the arms participate in the rotation (Fig. 171). Two to six times.

After having practised these five exercises the patient should pause, place his hands upon the hips and, with closed mouth, take four to ten deep inspirations and expirations.

(6) Turning the trunk to the left and to the right.—With the upper part of the body erect, the trunk is turned around its up and down axis. The exercise can be facilitated by raising the extended arms forward (see



FIG. 179. Raising the lower leg.



FIG. 180. Bending and extending the foot.

Fig. 150), and letting them participate in the turning movement (Fig. 172). After a brief stay in the turned position to the left side, the arms are turned back, following the same movements to the right side. Four to ten times.

The six trunk exercises here described are suitable for everybody. They are indicated especially in disturbances of the circulation of the blood in the abdomen, and in cases of constipation. Hence, they can be recommended to women and girls.

Rotary Movements of the Pelvis and Legs.—All the exercises mentioned under this heading strengthen the muscles of the pelvis and of the legs. They are not of much use in persons who are up and about practising these muscles by their daily exercise; but they are of great benefit to patients who have been bedridden. Since these exercises stimulate the circulation of the



FIG. 181. Standing on the toes.



FIG. 182. Incomplete bending of the knees.



FIG. 183. Complete bending of the knees.



FIG. 184. Lunging laterally to the left, swinging the arms obliquely upward.

blood in the vessels of the abdominal cavity as well as the movements of the bowels, their practise is advisable particularly in cases of hemorrhoids and constipation.

(1) Raising the legs sidewise.—The upper part of the body inclines slightly to the right while the left leg is extended for a few moments (Fig. 173); the raised leg is then brought back into the standing position, whereupon the same movements are repeated to the opposite side. Three to ten times.

(2) Raising the legs forward. (Fig. 174).—To be repeated three to twenty times.

(3) The same backward (Fig. 175).—Three to twelve times.



FIG. 185. Lunging laterally to the right, swinging the arms obliquely upward.

(4) Rotary movements of the thigh.—These are made by combining the three previous exercises. Movement 3 is executed first, and from the position shown in Fig. 175 the foot is made to describe a circle in the air (Fig. 176). Three to six times.

(5) Rolling movement of the leg.—The leg is raised either laterally, forward, or backward, and is rotated solely around its longitudinal axis, so that the leg scarcely changes its position, and merely the tip of the foot is rotated, first inward, then outward. Three to six times. Exercises 4 and 5 pump the blood into the abdomen with great force.

(6) Raising the knee (Fig. 177).—With the body erect, the left leg is raised and the upper part of the body inclined slightly to the right side, so that the entire weight of the body rests upon the right leg. Then the left

leg is again extended in the direction of the arrow, and the same exercise is performed with the right leg. When both exercises are alternated rapidly and continuously, the movements executed resemble a walking on the spot with raising of the knees, an excellent exercise for cold feet. Three to twenty-five times.

(7) Stretching of the leg.—From the position shown in Fig. 177, the leg may be extended in the direction of the arrow (Fig. 178). This exercise is suitable only for stronger persons. Three to ten times.

(8) Raising the lower leg (Fig. 179).—The thigh remains in its usual position.

(9) Bending and extending the foot (Fig. 180).—Exercises 8 and 9 are very suitable for patients with cold feet.

(10) Standing on the toes.—With the body erect, and both hands resting upon the hips, the heels are closely brought together, the tips of the feet directed outward; both heels are thereupon raised from the floor so that they are still in contact while the weight of the body rests on the toes (Fig. 181). This attitude is kept up for several seconds, after which the heels are again lowered. Three to thirty times.

(11) Jumping into the straddle position.—This exercise begins with the toe position (Fig. 181). In this attitude the feet remain for but a moment, and are then moved by a rapid jump simultaneously to the left and right; the first position is designated by footmarks in Fig. 168 and the arrows show the directions in which the feet are moved. While holding the feet apart the patient should draw several long breaths and then, by a similar jump in the opposite direction, bring his legs together again. Repeat from two to twelve times.

(12) Incomplete bending of the knees (Fig. 182).—The heels remain closely together and are slightly raised from the floor, the knees a trifle bent. After a brief stay in this attitude the legs are again extended into the original position. Two to twelve times.

(13) Complete bending of the knees (Fig. 183).—In this exercise the knees are bent lower than in No. 12; otherwise the exercise is the same. Exercises 12 and 13 are very suitable for men and boys, but not for girls and women.

Combination Movements.—The following are a few examples of exercises which combine several movements.

(1) Assume a position with the left knee bent as in Fig. 184, and alternate it with the attitude in Fig. 185 by swinging the arms downward and toward the other side, at the same time bending the right knee and stretching the left.

(2) This is a combination of exercise No. 5 of *Movements for the Shoulder-girdle and Arms*, and alternate raising of the knees (see Fig. 177), so that a movement of the arm is made simultaneously with a step on the spot.

Gymnastic Apparatus for the House.—A great number of practical apparatus for the house have been recommended. One of the oldest, and a very suitable one, is that of Largiadère, which is used to support the body in the exercise illustrated in Fig. 186. Interchangeable swinging rings and trapezes are likewise recommendable for home exercises.

An exercise as that shown in Fig. 187, performed with or without swinging, is suitable for strengthening the muscles of the back and of the chest. Fig. 188, an example of the many exercises possible with the swinging rings, shows how to execute an exercise that is eminently beneficial for the pelvis. The upper part of the body is made to rotate in such a manner



FIG. 186. Bending the trunk sideways, one arm extended upward, the other downward.



FIG. 187. Hanging in trapeze, with arms bent.

as to describe the form of a cone, the point of which is represented by the tips of the toes.

This exercise is highly advisable in cases of constipation, hemorrhoids, and slight curvatures of the spinal column. The movements should be made to the right and to the left alternately, and should be repeated from two to fifteen times in either direction.

II. Orthopedic Gymnastics.—This form of gymnastics is employed when bones and joints have lost their normal position and movability owing to morbid changes. In addition to baths, massage, and electricity, they are essential in orthopedic practise. Only the most prominent methods of application are here considered. Orthopedic institutes are resorted to mostly on account of curvatures of the spinal column. Since this disorder far more frequently affects girls than boys, it is evident that

muscular weakness is one of the chief causes. The object is, therefore, to strengthen principally the muscles of the small of the back and of the lateral portion of the back. Exercises for the relief of curvatures of the spine require great patience, on the part of the physician as well as of the patient. The examples in illustrations 151, 153, 154, 156, 157, 181, 193, and 195, serve to show the chief movements. In addition to spinal curvature, orthopedic gymnastics are important for the correction of faulty positions of the feet. In many of these patients a preliminary operation may be necessary.

In the after-treatment of injuries another extensive field is open to orthopedic gymnastics. The degree of success in the treatment of these

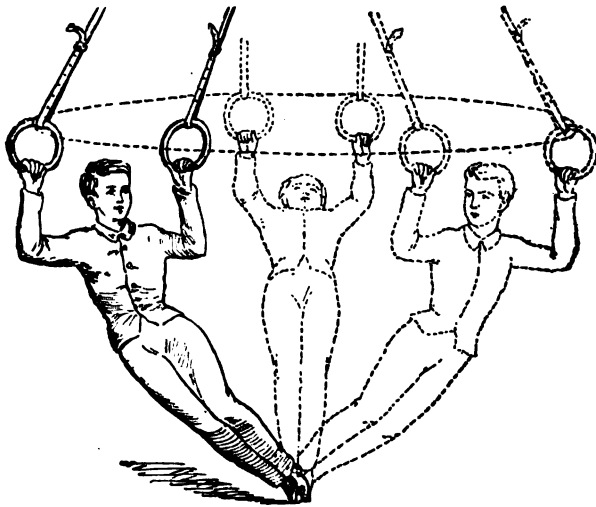


FIG. 188. Rotary swinging, to right and left alternately.

after-effects is quite considerable. It is very arduous work. It is necessary, in the first place, that the physician knows exactly the capacity and extent of motion of every joint. Then he proceeds very gradually, and step by step. The treatment should begin carefully with passive movements; that is, with those which the physician performs without the aid of the patient. Many of the exercises spoken of under the head of curative gymnastics are of value. Some of special importance are here considered.

Figure 189.—The patient stands erect, with the feet apart, holding the upper arms horizontally, and the forearms bent at right angles. The physician, standing behind him, so places his arms under those of the patient that the latter rest comfortably upon the arms of the physician. Then, during inspiration, the arms and the entire shoulder are raised, being again lowered during an expiration, the physician at the same time causing the patient's upper arms and shoulders to describe a small circle.

Figure 190.—The patient is seated upon a chair with his knees together, his hands resting upon the hips. The physician, seated in front of the patient, places his hands upon the latter's shoulders and turns the upper part of his body alternately toward the right and toward the left, in all three or four times to each side. If the patient supports the movements of the physician, the exercises are no longer called passive, but assisting exercises.

Patients afflicted with less severe affections must perform active movements, without the assistance of the physician. Exercises of this character are found under *Curative Gymnastics*. The physician terminates the



FIG. 189. Raising and lowering the shoulders.



FIG. 190. Turning the trunk sideways.

treatment by orthopedic gymnastics with movements of resistance; that is, he offers resistance to the active movements of the patient. Four examples of these movements, of which there are a great many, will be found in Figs. 199-202, under *Swedish Gymnastics*.

III. Respiratory Gymnastics.—These are to be distinguished from other gymnastic methods by the fact that they do not require the assistance of other persons or the use of any apparatus. For this reason they have always found great favor with the public. The fanatics who give themselves up to the extremes of cold-water treatment are well matched by a similar class who are followers of this method of gymnastics. These persons usually possess some one of the well-known works on "home gymnastics" and apply its teachings for every purpose. The general rules

contained in such books are suitable perhaps for healthy individuals, but people who are ill can be benefited only by regulations adapted to each particular case. This choice of exercises is rendered possible by the highly developed character of the system of respiratory gymnastics.

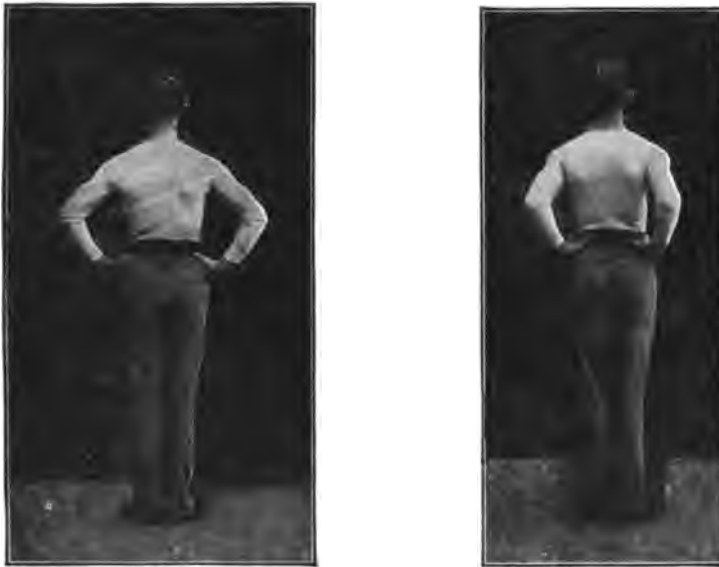
The various procedures, which are more or less complicated, require care and judgment in their execution; and the most practical form of giving the necessary instruction is by means of a series of sessions in which the details may be carefully explained. The instruction must include, not only the demonstration of the individual exercises, but also the effects of the respiratory movements; for it is of extreme importance that the patient should acquire a knowledge of the principles of the treatment, even if that knowledge be somewhat superficial. Without such knowledge the patient will not be able to carry out the treatment intelligently, because mere mechanical and thoughtless movements fail to accomplish the desired results.

An endeavor will therefore be made to present the main points of such a course of instruction, although the force of example and the personal supervision of a trained instructor are two essentials which can not be supplied. Three main divisions of the subject are to be noted: (1) bilateral and unilateral respiration; (2) the various forms of respiration; and (3) the respiratory periods.

In bilateral respiration distinction must be made between thoracic and abdominal breathing, as discussed on pages 52-53. The muscles which necessarily act are the costal muscles, the diaphragm, and the abdominal muscles. The respiratory act may, however, be made to include all the other parts of the body, with the exception of the forearms and hands, and the legs and feet. It is important to make use of the movements of the spinal column, for extension of the thoracic portion of the column increases inspiration, while forward flexion of the lumbar portion causes a diminution in size of the abdominal cavity and a corresponding increase in expiration. Backward movements, causing the lumbar vertebræ to form a straight angle with the sacrum, again favors inspiration.

In addition to these, a number of movements are employed which involve the arms and shoulders. In the first place the entire shoulder-girdle, that is, the shoulders and the upper portion of the chest, may be raised and lowered. By elevating the shoulder-girdle, including the upper ribs, inspiration may be increased. In the second place, the shoulders may be moved forward and backward, without any effect on the respiration, but with the result of pulling on the apexes of the lungs. The backward movement of the shoulders, however, elevates the upper ribs and in this manner aids inspiration. The arms may assist this movement of the shoulders, if the hands are rested on the hips and the elbows then drawn backward, as shown in Figs. 191 and 192. In the third place, the

shoulders may be raised and lowered without using the upper portion of the chest, which results in aeration of the apexes of the lungs and a localized inspiration. As a rule this may be accomplished by carrying the extended arms from the sides above the head, as shown in Fig. 193, holding them in this position until three deep breaths have been taken through the nose with mouth closed, and then returning them to their original position. Children may repeat this exercise about three times, adults up to eight times. If the hands are folded across the back and then suddenly thrust downward, as shown in Figs. 194 and 195, an ex-



FIGS. 191, 192. Resting the hands on the hips, and drawing the elbows backward, to assist inspiration.

piratory movement results, because the shoulders are lowered. This movement may be repeated five to ten times, inspiration taking place on folding the hands across the back, and expiration accompanying the downward movement.

The next shoulder exercise is a combination of elevation and depression with forward and backward movements of the shoulders. This results in a rotation, which may be carried out in one or in both shoulders. The shoulder should be elevated and drawn forward in connection with inspiration; while expiration should accompany the depression and drawing backward. This exercise may be done with arms lowered in their natural position, by elevating the shoulders while drawing them forward, and lowering them while drawing them backwards. Or the movements may be increased by calling the arms into play. For this purpose the arms are carried above the head as shown in Fig. 193, and then downward and

forward (see Fig. 196) to the sides. This is done during expiration and constitutes the first half of the exercise. The second half consists in carrying the arms back as far as possible, and then upward until, after rotating the forearm, they are brought to their original position (see Fig. 193). The latter half of the exercise is done during inspiration.

Another effectual exercise consists in extending the arms at right angles to the body, and then describing circles with the hands, as shown in Fig. 197. This is a very practical movement, is attended by little fatigue, and may be repeated from five to fifteen times.

In all the exercises just mentioned, a horizontal plane may be con-



FIG. 193. Extending the arms above the head.



FIG. 194. Holding the hands folded on the back.

sidered as dividing thoracic from abdominal respiration, whereas a vertical plane separates right-sided from left-sided breathing.

The movements of unilateral breathing shall be but briefly mentioned, because of themselves they have very little influence on respiration in general, one side of the chest being compressed while the other is being expanded. If the right side is to be favored, it may be done, as shown in Fig. 198, by holding the left side of the thorax at rest by pressure with the hand while breathing is carried on with the other half. The reverse of this is done when the left side is to be developed.

In the next place, attention must be directed to the manner of breathing, as this has been very much neglected by the laity. A few essential points will be noted. Regarding the length of the respiratory act (that is, the num-

ber of breaths taken in any given period of time) two features are of interest. Slow, deep inspirations particularly favor the exchange of gases, the absorption of oxygen, and the excretion of carbonic acid; whereas rapid, superficial breathing serves rather to cool the respired air and to aid the excretion of moisture.

The length and depth of the individual respirations is also of extreme importance. These may be regulated so as to yield a number of useful exercises, such as a slow inspiration with rapid expiration, or a quick, deep inspiration followed by a drawn out and extended expiration. These distinctions are not founded on imaginary differences, but are drawn from



FIG. 195. Lowering the folded hands on the back.



FIG. 196. Lowering the arms with a forward movement.

the various modes of breathing as found in daily life. Thus, coughing consists of a short projectile expiration through the mouth, following a prolonged inspiration; sneezing, of a short forcible expiration through the nose, preceded by a prolonged inspiration; sobbing, of rapid inspirations with contraction of the vocal cords, etc. The acts of laughing and crying are marked by spasmodic breathing. Laughing consists of short, rapid expirations, while retaining the attitude of inspiration; and crying, of long and less frequent expiratory movements, while in the attitude of expiration.

In addition to these procedures, resistance to the respiratory movements may be interposed as part of the gymnastic exercises. Even breathing through the nose, as compared with breathing through the mouth, introduces an element of resistance which benefits the body, for the intrathoracic pressure is reduced by inspiration and increased by expiration.

This quickens the pulmonary circulation, and stimulates the heart-action and the vessels of the entire circulatory system. If increased resistance is desired, the respiration may be carried on through the right and left nostril alternately, that which is not immediately employed being closed by pressure with a finger. When both nostrils are held shut and the mouth is tightly closed, the ingress and egress of air is stopped, but the respiratory movements may be carried on by the usual muscular action. The exchange of air may also be inhibited to a considerable extent, even with the mouth and nose open, by laryngeal contractions. This may be done by carrying



FIG. 197. Describing circles with the hands.



FIG. 198. Favoring the right lung in breathing.

out the respiratory movements and then attempting to retain the air in the lungs by voluntarily closing the cleft between the vocal cords. In order to accomplish this, a deep inspiration is made, the larynx closed by the motion of swallowing, and then an expiratory movement attempted by means of the thoracic and abdominal muscles. Then again the opposite may be done, the larynx being closed after a strong expiration, after which the abdominal and thoracic muscles are relaxed. By this means marked differences in pressure may be elicited in the abdominal cavity. The abdominal organs are thus pressed together or separated, and in either case the heart is caused momentarily to cease its action. In this way the various body-cavities may be alternately filled with blood or deprived of the same.

This variety of breathing-exercises should not be practised more than from three to five times. If it is desired to do it any oftener, an intermission of at least ten minutes should be allowed for rest, or, if this is not

needed, other gymnastics may meanwhile be practised. So long as one feels well while carrying on this form of respiratory gymnastics, no harm will result; but great care should be taken not to overdo the exercising. Owing to the fact that the heart-beat may be suspended during the act, overindulgence may bring on a faint, or, in exceptional circumstances, death. Such severe cases are usually heralded by some premonitory warning signs. When these appear the exercise should be stopped; and when repeated at a future time it should not be carried to excess.

Repression of all the movements of breathing results in a respiratory pause. A long breath may be taken with the mouth tightly closed, and the air retained as long as possible. When this limit has been reached, the breath may be quickly released. According to Professor Niemeyer



FIG. 199. Attempting to stretch the arm under resistance.



FIG. 200. Attempting to bend the arm under resistance.

these pauses afford a ready means of testing a healthy lung; for a man with well-developed thoracic organs can retain this position for about a minute.

The exercises just described should be limited in their application to those who are perfectly healthy, or to convalescents who are not afflicted with organic disability, for the purposes of strengthening and developing the lungs. Systematic, prolonged and deep respiration is to be recommended for those suffering from pulmonary troubles, and for those in whom a change in the contour of the thoracic cavity has been brought about by rickets. Deep and prolonged inspiration increases the flow of blood to the lung, aids its nutrition, assists bronchial excretion, strengthens the respiratory muscles, and renders possible the more complete filling of the right side of the heart with blood. Prolonged expiration while the vocal cords are contracted, as in screaming, singing, elocution, etc., diminishes the flow of blood to the heart. With the next inspiration it again becomes overfilled. The favorable influence which deep breathing exerts on the body is well demonstrated in infants, who carry it out involuntarily

while screaming. It is a popular belief that crying infants always do well, and this belief is supported also by medical experience. If it is desired to practise deep and prolonged breathing as an exercise, the limits of normal inspiration and expiration should be determined with the second hand of a watch, and then the attempt made to prolong them. When it has become possible, without undue exertion, to prolong these periods so that an increase of several seconds is noted, efforts should be made to repeat these several times in succession; and when this can be done ten or twelve times without unusual effort, attempts should be made to prolong the individual respirations a second time, and so forth. It is advisable to alternate these



FIG. 201. Attempting to bend the knee under resistance.



FIG. 202. Attempting to stretch the knee under resistance.

breathing exercises with other gymnastics; and singing, elocution, and reading aloud are also to be recommended. The various respiratory exercises may be carried out to a certain extent with one lung at a time.

The term "breathing period" may be applied to a combination of the different respiratory exercises. For example, a period may consist of five deep inspirations, interpolated with four short, and a final prolonged and deep, expirations. By such combinations the effect of the various types of respiration may be increased, either by strengthening and prolonging the individual movements, or by alternating opposing exercises, such as voluntary expansion and contraction of the thorax.

The direction of these exercises by the physician consumes both time and patience, but there is no doubt of their value and of the good results which may be accomplished. Among the great variety of respiratory exercises which have been devised, only a physician is able to select those which shall prove most suitable to the condition of the individual patient. It is ridiculous for patients to follow a promiscuous course of gymnastic exercises of this kind without any regard for the condition which it is desired to benefit.

Respiratory gymnastics are indicated in all diseases whose symptoms would be improved by increased muscular activity: a weak voice, narrow chest accompanied by general bodily weakness, tendency to pulmonary consumption, or bronchial catarrh. In all diseases characterized by mechanical disturbances which would not be benefited by muscular activity, or which might even be aggravated thereby, the respiratory exercises should be omitted, or should be practised only in selected cases, and with the utmost precaution. Among such diseases may be mentioned contraction of air-passages, asthma, emphysema, pleurisy, and empyema. In these conditions treatment by special pneumatic apparatus may be indicated.

In pulmonary consumption, where the course of the disease has been halted, respiratory exercises may be of great assistance, but especial precautions must be taken against hemorrhages and the extension of the tuberculous process. The exercises should be taken only on the recommendation and with the consent of the attending physician. In consumptives the attitude of inspiration should be encouraged, directions being given to draw the ribs upward and to push the backbone forward. These inspiratory exercises must not be overdone, as they are apt to cause vertigo, to bring on hemorrhages from the nose and lungs, or to cause a rush of blood to the head. After an attack of pleurisy, unilateral exercises may be undertaken only when recovery is far advanced. Emphysematous cases will be benefited only by those exercises which favor expiration.

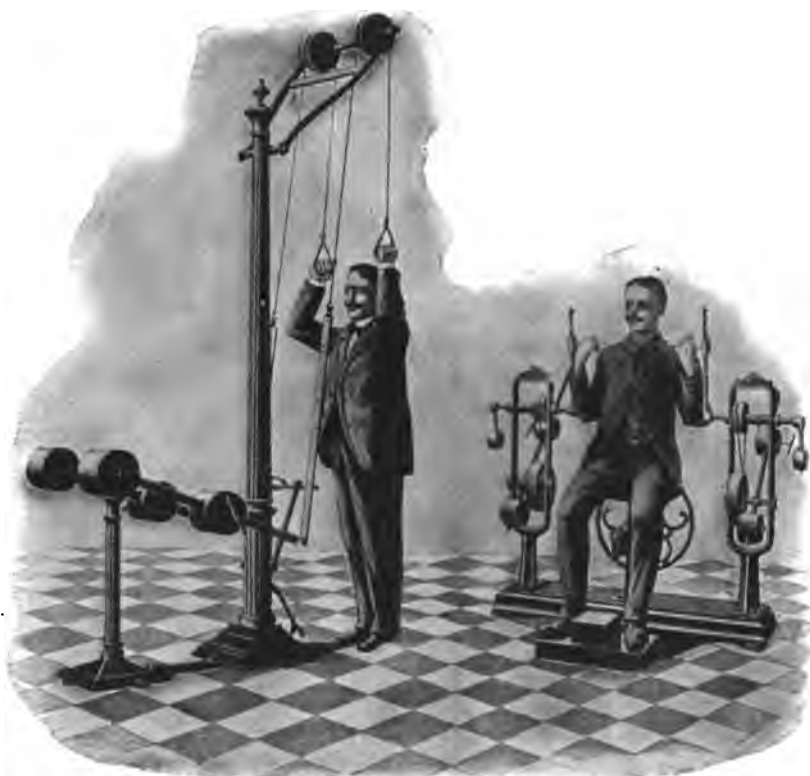
Respiratory exercises are also indicated in many general diseases, including anemia, chlorosis, obesity, diabetes, and neurasthenia. In persons who have recovered from severe illness they are likewise often advisable.

IV. Swedish Gymnastics.—The chief characteristic of Swedish gymnastics is that they require the assistance of a second person, resistance to the patient's movements being the main feature of these practises. A few explanations may illustrate the effects of these resistance gymnastics.

Every contraction of a muscle causes the sensory nerves to be pressed upon by the muscle-fibers. This stimulation is transmitted directly to the brain and spinal cord, from where the stimulus is in turn imparted to the different parts of the body which stand in connection with the stimulated nerve-centers. As a result these parts of the body are better supplied with blood; and therefore better nourished. By offering resistance to the patient's movements, as is done in Swedish gymnastics, the pressure exerted upon the sensory nerves by the muscle-fibers becomes stronger, and as a result the beneficial stimulation becomes greater. These gymnastics exert a favorable influence also upon respiration and upon the heart, and are therefore frequently employed in cardiac conditions.

The accompanying four illustrations may serve as examples of the various resistance exercises. Fig. 199 shows a patient attempting to stretch

his arm under resistance from the second person, who exerts an opposing force in the direction of the arrow. Fig. 200 represents the opposite case, the patient endeavoring to bend his arm while the assistant draws it toward himself. Figs. 201 and 202 illustrate similar exercises for the legs, the



FIGS. 203, 204. Zander's resistance machines for certain arm movements.

arrows showing the directions in which the assistant exerts his resistance to the patient's movements.

Swedish gymnastics are employed with beneficial results in certain female diseases, in which it is of importance to influence the circulation of the blood in the abdomen. Measurements have demonstrated the fact that these exercises cause a diminution of temperature in the female genital organs. Whether it is possible also to bring about an increase of temperature, is at least questionable; at all events, investigations along these lines have not as yet furnished any positive support for this assumption. The Swedish investigator Thure Brandt (d. 1896), who concerned himself most exhaustively with the mechanical treatment of female diseases, discovered through experiments the different exercises which influence the circulation

of the blood in the pelvis. A scientific criticism of his theories was not furnished by physicians until later. This criticism has proved that by no means all of the contentions are tenable which Brandt advanced in his enthusiasm for his method.

Swedish gymnastics were elaborated and systematized by Per Henrik Ling (1776-1839) of Stockholm. After a brief period of full development they fell into oblivion, owing partly to the boasting of many adherents of the system, and partly to their indiscriminate application by Swedish professors of gymnastics. They did not come into favor again until the Swedish physician Zander substituted mechanical devices for human forces. Every movement of the body may now be executed by a separate apparatus, so that a collection of 40 to 80 machines are required. Institutes in which such machines are used are called Medico-Mechanic Institutions. Figs. 203 and 204 are examples of the machines invented by Zander.

GYNOCARDIA.—This is obtained from *Gynocardia odorata*, and perhaps from other related species, large trees, native to Burma. The seeds contain a high percentage of oil, which is extracted by various methods. Chaulmoogra oil, as it is called, is extensively used in veterinary practise, and has come to be widely applied as a remedy in the treatment of leprosy and chronic skin conditions.

H

HAIR, CARE OF.—Although heredity plays an important part in the development of the hair, much may be accomplished toward directing its growth in a favorable manner. Up to about its sixth year, the child's hair should be frequently cut in order to insure a vigorous growth. It should be borne in mind that long, thick, curly hair is a great accumulator of dust, and that hair which is kept moderately short can be most readily washed and cared for. Boys should under all circumstances wear their hair closely cropped. Hair which preserves its natural luster without being damp or greasy, does not require any other care than the frequent washing with soap (about twice a week). Dry, bristly, lusterless hair is best treated with lanolin or other pomades. It is highly advisable to take care of the hair also before going to bed; and it should be remembered that artificial measures to promote its growth can act much more efficaciously during the night than in the dust of the day.

Hair-brushes should be selected with moderately stiff bristles, so that they may give the scalp a certain amount of massage. Broad, double brushes (one for each hand) are to be recommended. Hair-brushes should be cleaned often and thoroughly, as otherwise an incredible amount of dirt will accumulate in them. It is advisable to free the brush of hairs

and dust directly after using. The combs used should have dull teeth, in order that they may not injure the scalp.

Dandruff is one of the most frequent disturbances of the growth of the hair. This affection, which is characterized by the formation of a scurf which comes off in fine scales, not only gives the hair a dusty gray, lusterless appearance, but also creates the impression of uncleanness on the part of the individual thus affected, on account of the condition of the

clothes. At the onset it should be stated that the application of alcoholic hair-tonics (and most of the widely advertised remedies of this kind contain larger or smaller amounts of alcohol) is absolutely out of place. Such remedies are extremely harmful, since they only tend to dry the scalp in consequence of the evaporation of the alcohol.

According to medical experience there is only one remedy which is efficacious in this condition, and that is shampooing the scalp with the yolk of an egg. This remedy is prepared by stirring the yolk of an egg with ten drops of chloroform until it forms a bright yellow mass re-



FIG. 205. Circumscribed areas of gray hair.

sembling ointment. This should be firmly rubbed into the scalp and around the roots of the hair, about a teaspoonful being used at a time. This process should be repeated twice a week, and after each application the excess of yolk should be washed out with a good lanolin soap and the hair rubbed dry with a linen towel.

Prematurely gray hair is another condition which is of rather frequent occurrence. The color of the hair is due (1) to a certain pigment furnished by the hair-follicle and derived from the coloring matter of the blood, which latter also causes the racial color of the skin; and (2) to the light-refraction from the hair. It follows, therefore, that changes in the color of the hair may be caused either by the absence of pigment (as in circumscribed areas of gray hair; see Fig. 205), or by the entrance of air. In the latter case the air-bubbles diminish the transparency of the hair and reflect the light which strikes it, just as dull (uneven) glass appears to be

of a milky white color because the white light is refracted in many rays. That the hair becomes gray with age is mostly due to the entrance of air into the marginal cells of the hair-shafts which have become more brittle; much less frequently to the absence of pigment. The fact that the hair may turn gray all of a sudden in consequence of sorrow, fright, excitement, pain, etc., can be explained only as being due to a sudden change in the amount of fluid contained in the hair-shafts, and which paves the way for the entrance of air into the outer layer of the scalp.

A marked loss of hair takes place after infectious diseases, such as typhoid fever, influenza, diphtheria, syphilis, etc. This represents a troublesome form of affection, a true weakening of the scalp; and the deficiency of hair-formation leads to complete baldness (see Fig. 206). It is beyond question that predisposition (heredity) as well as acquired injuries are factors in causing this affection which, probably on account of an erroneous belief in the possibility of losing



FIG. 206. Complete baldness.



FIG. 207. Bald spots.

the hair in consequence of excessive enjoyment, often causes the afflicted individual to become the target for sarcasm and raillery. However, the mode of living has but a very limited influence upon the loss of hair, and only in so far as it is fraught with special dangers. Youthful dissipations and early baldness have very little relation to one another. The loss of hair often occurs in almost regular, circular or oval spots (see

Fig. 207). The cause of this phenomenon is not fully explained as yet; either nervous influences or the action of fungi are held responsible. Treatment

consists in the application of stimulating or disinfecting remedies, such as tar in the form of soap, or mixed with the yolk of an egg. If mental exertions are held responsible for the loss of hair, other symptoms affecting the general health should be sought for. Pressure of the hat-rim is likewise often wrongfully regarded as the cause of circumscribed baldness. It is possible that continued pressure may diminish the blood supply to the scalp, and thus cut off the nourishment of the hair-follicles. In such a case it is advisable to invigorate them by frequent massage (combing) and by washing with the yolks of eggs. The various remedies, so extensively advertised, are not likely to accomplish more than massage combined with the application of tar and egg-yolks.

HAIR-DYES.—The modern art of dyeing the hair has advanced so far that it is able to comply with the taste (or lack of it) of every one who is prompted by the singular desire to improve upon nature by changing the color of his hair. Caution should be given against such a step into the dark unknown. The majority of those who have had their hair dyed, have been thoroughly dissatisfied with the result. Since the proper dyeing of the hair requires a thorough knowledge of the properties of the dye employed, the experiment should never be undertaken without the aid of an experienced hair-dresser. Harmless hair-dyes do not exist.

To prevent the hair from turning gray, frequent washing with the yolk of eggs can be recommended. The oil of eggs is an old Roman device for preserving the hair. Neat's-foot oil has also been highly and justly recommended as a means of darkening the hair.

Hair-dyes in pomades act very slowly, and must be used daily until the desired results have been attained. Those prepared from vegetable ingredients are in general to be preferred to those containing metallic substances. Walnut shells and green walnuts dye blond or gray hair, first yellowish, then dark brown; but the color is not durable. Nut pomade is of no use whatever. The action of nut extract is due to its contents of iron chlorid, pyrogallie acid, copper chlorid, and free hydrochloric acid. Powder made from the leaves of the henna-bush and the indigo-plant in correct mixtures (which may be determined by experimenting with bristles) will give shades of yellow, orange, brown, and deep black. Brown coal (lignite) with ammoniac, potash, and peat-water—a mixture known as "Nerin"—is also used for dark shades. Kohol is India ink with gum dissolved in rose water; mixed with silver salts, verdigris, iron tannate, lead carbonate, and other mineral substances, it gives dark shades.

Blond shades (in great favor among certain lower classes) are acquired by washing the hair with hydrogen peroxid. Dyes that contain lead (and these are by no means few) are particularly dangerous, often leading to lead-poisoning. Before applying the dye, the hair should be freed of all fatty matter by the application of a mixture of twenty parts of chloroform

with eighty parts of alcohol. The dye is applied with a comb and a new tooth-brush, and the hands should be protected by gloves.

HAMAMELIS (WICH-HAZEL).—The bark, twigs and leaves of *Hamamelis Virginiana*, a widely distributed shrub or small tree, indigenous to the eastern and central parts of North America. The active principles found in hamamelis are tannic acid and volatile oils. Its chief value lies in its contents of tannic acid; and it is therefore useful as an astringent gargle in mild sore throats, and may be of certain service also as a local application in hemorrhoids. Taken internally it has the action of other mild astringents. Wich-hazel is largely used as an external application for sprains, bruises, wounds, etc. In these conditions, however, it has no specific action, its chief value resulting from the fact that it is cleansing, and that the alcohol used in the preparation of the remedy is antiseptic and cooling. A weak solution of alcohol is just as beneficial as a wich-hazel solution, and is much cheaper.

HANDS, PERSPIRATION OF.—See SKIN, CARE OF.

HARDENING.—A great deal of harm has been done by the indiscriminate use of measures for which this term has furnished an excuse. Many a sick person has been permanently injured by senseless procedures with which it was intended to harden the system. Great care must always be exercised in employing such remedies.

The term "hardened" may be applied to the body when it has become inured to changes in temperature to such a degree, that every change in temperature does not necessarily bring on a cold. This depends on the ability of the blood-vessels in the skin readily to adapt themselves to differences in temperature of the air or the water. The rapidity with which the reaction in the skin takes place is the important factor. The blood-vessels must dilate or contract very quickly, and thus become rapidly filled with or emptied of blood.

Two forms of hardening must be considered: that of the outer skin, and that of the mucous membranes lining the respiratory organs. When the former becomes inured, the latter usually take part in the process. This, however, is not always the case, for the mucous membranes may be locally inflamed owing to confinement in stuffy rooms, dusty or smoky air, or to congestion brought about by excessive speaking, singing, or indulgence in alcoholic beverages. In such cases measures which tend to harden only the outer skin will be found insufficient, and the local causes must be removed. The patient should forego the use of alcohol and tobacco, avoid singing and speaking, and take care to inhale pure, warmed air, if necessary by a change of residence. In this way the catarrhal condition brought about by irritation will be removed; and thus the mucous membranes will become strengthened and hardened, and will be better able to withstand sudden influences.

The outer skin may be hardened by increasing its power to react during changes of temperature. For this purpose a good circulation must be provided for, and the blood itself must be in good condition. This may be accomplished by appropriate nourishment, gymnastic exercises, the administration of suitable medicines, by keeping out in the open air and in the sun, by wearing proper clothing, by sleeping with a window open when the weather is favorable, by avoiding drafts, and by taking daily sponge baths of the entire body, at first with lukewarm, later with cold water. Numerous difficulties may attend these measures when the person is or has been ill, and they must always be carried out gradually, and under careful supervision. Moreover, the body must first be sufficiently strengthened in order that its powers of resistance may be increased. After acute diseases, convalescence should be far advanced before anything is done.

Children may be hardened by giving them warm baths followed by cool douches, but not by cold baths or cold douches alone. The wide-spread custom of immersing infants in a cold bath is dangerous, and numerous warnings have been circulated by eminent physicians as to the harmful character of this proceeding. A cold bath deprives the child of too much body-heat at once, and in many instances the custom has undoubtedly laid the foundation for subsequent nervous troubles and other diseases. Infants may be most readily injured by gradually lowering the temperature of the daily bath during the first year, say from 95° F. to 78° F.

HARELIP AND CLEFT PALATE.—The formation of the face in the developing child is accomplished by outgrowths which proceed from the



FIGS. 208-210. Harelips.

forehead and the upper jaw on both sides, joining in the center. The more or less incomplete union of these outgrowths, in consequence of disturbances of development, results in permanent fissures in the upper lip, in the upper jaw, or in the palate. These fissures may vary as to form and extension. A fissure of the upper lip forms the so-called harelip. This may consist either in a slight cleft at the border of the lip; or the fissure may extend through the entire lip up into the nostril (see Figs. 208, 209, 210). As a rule the cleft is not formed in the center of the lip, but slightly to one side. A harelip may exist alone, or it may be combined with a cleft of the upper jaw and palate (cleft palate). Sometimes a cleft may form on each side, leaving an intermediate space between.

Harelips not only disfigure the face, but are harmful to the health of

the child. Nutrition usually suffers considerably, especially if also the palate is fissured so that the milk flows out through the nose. Intestinal catarrhs soon follow, and the deficient closure of the mouth often causes affections of the lungs. It is, therefore, not only desirable, but urgently necessary, to remove the harelip; and this should be attempted as early as possible. The treatment is operative, and in the mild cases usually easy to perform. The severe cases require great skill. The stronger and healthier the child, the more favorable are the prospects of a satisfactory cure; the poorer its nutritive condition, the less hopeful the treatment. Unfortunately the latter is often the case, as many parents will not agree to an operation until they see for themselves that the health of the child becomes more and more impaired.

Conditions are different in cases of cleft palate. In these affections the fissure may be either single or double, a projecting centerpiece separating the clefts if the latter condition exists. The operative union of the separated parts of the bones is a more serious matter than suture of the lips, and the treatment is not well borne by all little children. The surgeon will be the proper judge as to the best time for performing the operation.

HARVEST-TICK.—A small, six-legged insect, about $\frac{1}{3}$ mm. long and broad, and of a red color (see Fig. 211). It habitates grasses and shrubs, especially gooseberries, and occasionally, late in summer, it makes its way into the skin of human beings, where its presence causes redness of the skin, nodules, pimples, and violent itching. In the center of each nodule and pimple the mite itself may be seen as a red spot. The parasite, which is otherwise harmless, is rapidly removed by embrocation with a scabies remedy, such as sulfur-ointment.



FIG. 211. Harvest-tick.

HAWKING.—A symptom of various affections of the throat, occurring especially in catarrh of the PHARYNX (which see).

HAY-FEVER.—A catarrhal affection of the mucous membranes of the eyes and air-passages; called also summer catarrh, hay-asthma, etc. The true causes of hay-fever are still in doubt. It seems to be established that the affection occurs at the flowering-time of nature, and that it is caused in sensitive individuals by the pollen of various plants, either because certain ethereal oils, or other substances which develop under the influence of sunlight during the first flowering, have entered the air-passages together with the pollen, or because the latter have served as a means of conveying parasites to the mucous membranes. It often happens that all persons who

live in the same locality, and who are sensitive to hay-fever, become affected about the same time. It is possible, therefore, to predict almost with certainty when hay-fever will make its appearance in different places. It is not improbable that the psychic factor is a very large one in the development of hay-fever; and it is a noteworthy fact that the rural population is usually exempt from the disease. As a general rule, hay-fever affects only persons of the educated classes, so that it may be assumed that mental exertions and general nervousness create a diminished resistance to its causative factors. Societies which devote themselves to investigating the affection have been established at various times in various countries.

The first manifestations of the disease usually appear immediately after the action of the injurious agent; as, for instance, after a walk across a meadow, or after smelling fragrant flowers. Occasionally the symptoms are preceded by general malaise, by loss of appetite, or by slight attacks of fever. Prominent symptoms soon manifest their presence by catarrh in the nose, in the conjunctivæ of the eyes, in the pharynx, or in the ears; or there may be more or less severe attacks of asthma.

Nasal catarrh develops with burning and itching sensations in the nose, increased secretion, tendency to sneeze, and obstruction to nasal respiration. By means of the naso-lacrimonal canal the infection is conveyed to the conjunctivæ of the eyes, where it gives rise to increased secretion of tears, fear of light, and swelling of the eyelids. This may be followed by catarrh of the pharynx, with sensations of itching, burning and dryness; and if the inflammation reaches the lower air-passages, cough and expectoration may result. Violent pains occasionally occur in the forehead and in the back of the head; and slight fever is not infrequently a symptom. Hay-fever corresponds exactly to a well-developed asthmatic attack (see **ASTHMA**).

An attack of hay-fever generally persists for several weeks, and may recur year after year if similar causes are active. Annoying as it is to the person affected, no severe disorders or even lasting illness develop as a consequence of the affection. There is no sure remedy for hay-fever, but the removal of the frequently existing swellings of the lower turbinate bones causes relief in many patients, and sometimes effects a permanent immunity to further attacks. Naturally, certain prevention is possible only through measures which entirely hinder the entrance of the injurious agents into the body. For persons of means it is especially advisable to travel to parts of the country which are free from hay-fever, when the time of flowering begins in their own locality. Among localities which are considered to be exempt from hay-fever may be mentioned high mountain regions, some of the islands of the North Sea (principally Helgoland), the Polar zones (where only mosses and lichens thrive), and the saltpeter coasts of northern Chile and southern Peru. The Baltic Sea offers no protection. In the United States the White Mountains, the Adirondacks, and the mountains of the

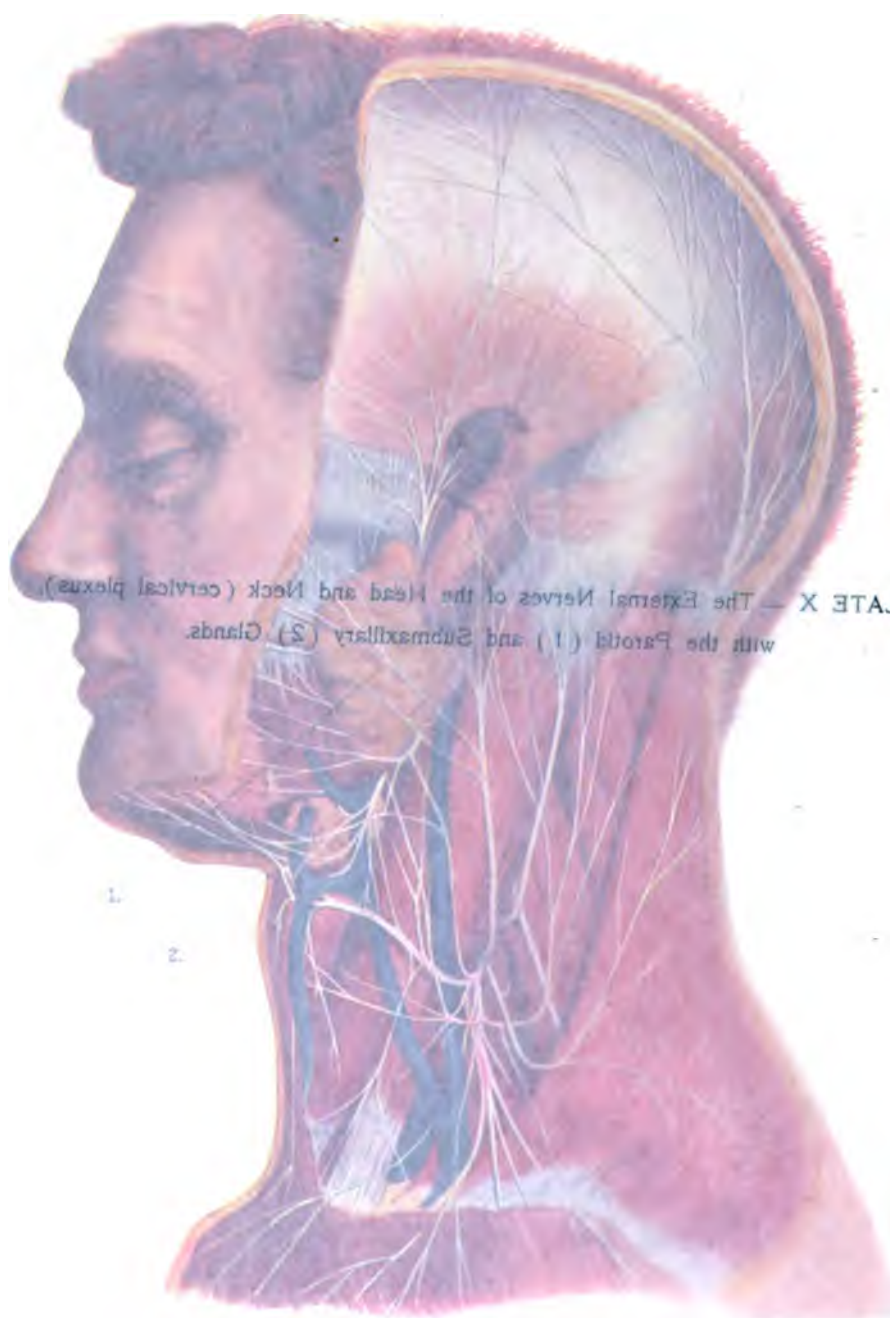
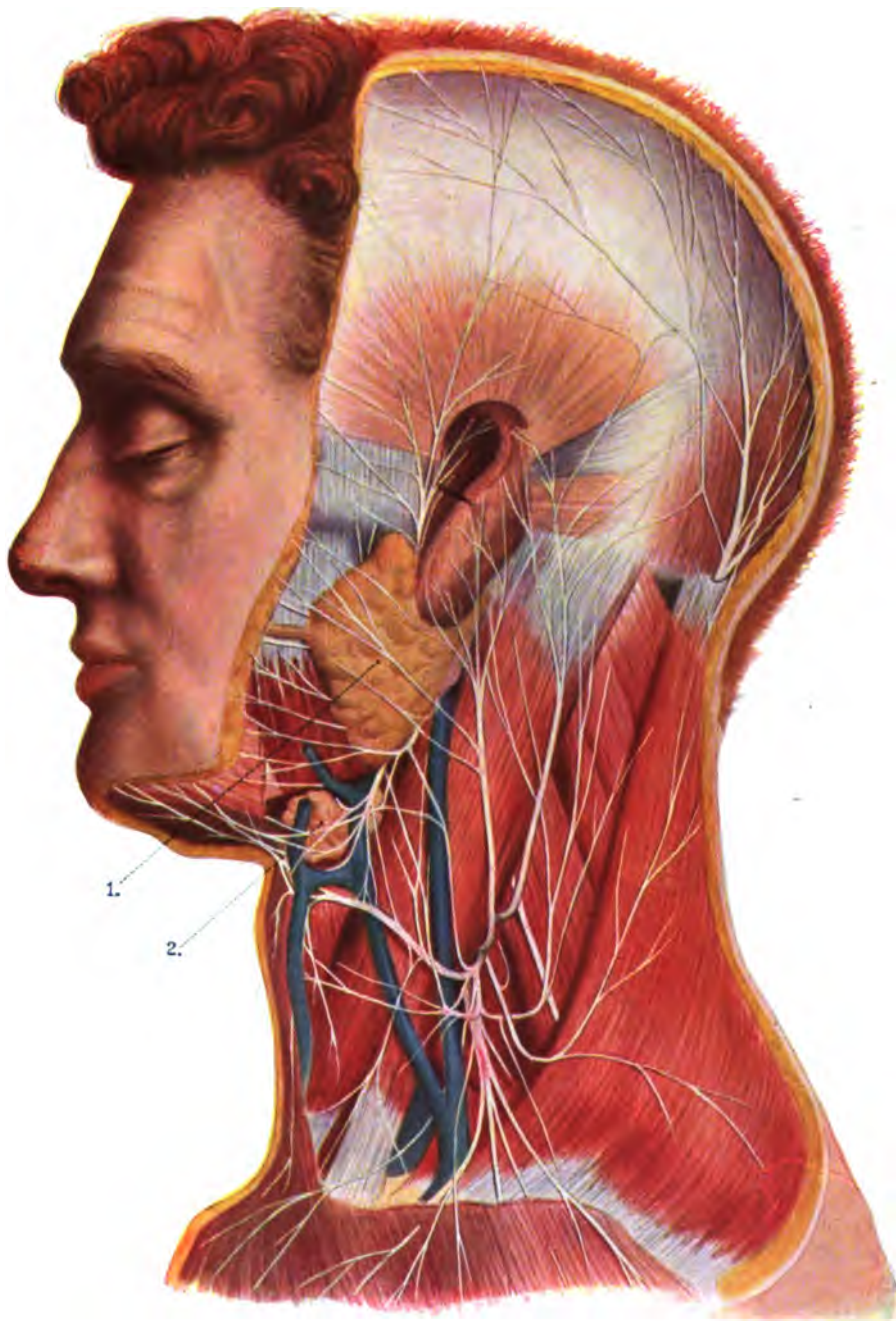
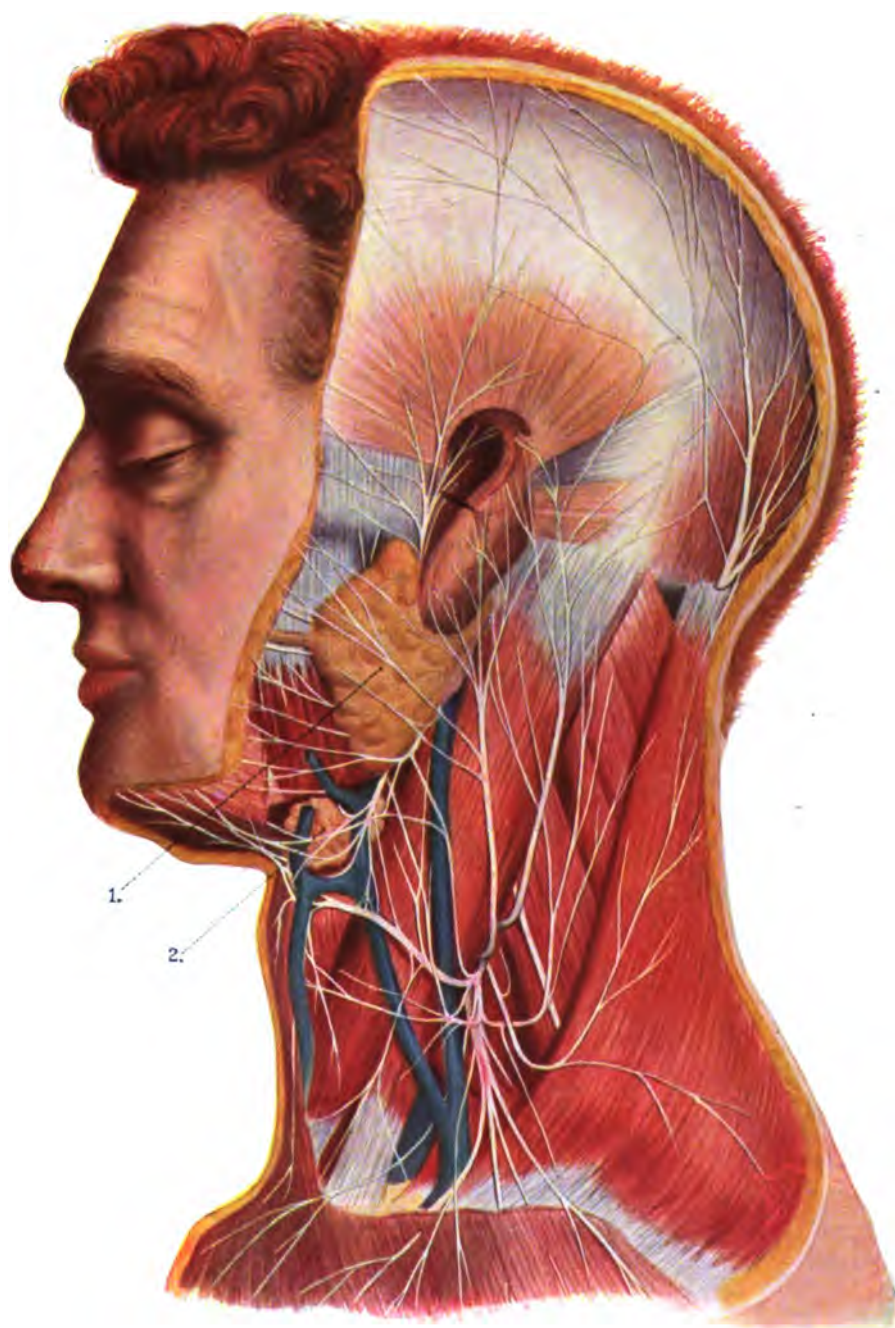


PLATE X — The External Nerves of the Head and Neck (cervical plexus),
with the Parotid (1) and Submaxillary (2) Glands.

PLATE X - The External Nerves of the Head and Neck - cervical plexus .
with the Parotid and Submandibular Glands.



**PLATE X — The External Nerves of the Head and Neck (cervical plexus),
with the Parotid (1) and Submaxillary (2) Glands.**



west are favorite resorts. A curative serum has recently been prepared in Hamburg, but its efficacy is still to be proved. Frequent washing of the nose with antiseptic solutions often wards off an attack.

HEADACHE.—A symptom of a great many disorders. They are so numerous that they can not all be mentioned in this place. Apart from accident, headache becomes manifest after mental and physical over-exertions, after overheating, exposure to cold, insomnia, difficult sleep, and emotions. It generally accompanies affections of the eyes, nose, stomach, intestine, kidneys, and sexual organs. Since headache is not an individual disease, but merely the symptom of a disease, it is important to determine the original affection. This is frequently a difficult undertaking, and physicians are often obliged to treat the headache as such, owing to its annoying nature. Among remedial measures may be mentioned cold or warm compresses, ice-bags to the head, hot or cold foot-baths, mustard poultices over the abdomen or neck, and electricity.

These measures, however, will not always produce results which are as satisfactory as properly selected and correctly executed manipulations. In most cases of headache, notwithstanding the cause, there is an excessive amount of blood, or a congestion of blood, in the cranial cavity. That this is the case may be inferred from the fact that redness of the face, plethoric veins, and throbbing arteries frequently accompany this condition. The excess of blood may be mechanically removed by dilating the outcarrying blood-vessels (the veins). This may be accomplished by Nāgeli's manipulations, which are carried out as follows:

The patient is seated upright in the bed or upon a chair, with his back to the masseur. A watch with a second-hand is placed so that it is readily visible. The head of the patient is then grasped with the palm of the hand at the cheek-bone and the thumb at the back of the head, care being taken not to squeeze the lobe of the ear or to exert undue pressure with the thumb. The elbows of the operator are placed upon the shoulders of the patient or upon the back of the chair (see Fig. 212). Then the head of the patient is stretched upward, with a steady, strong, yet careful lift, until the neck has been extended about one and a half inches. The head of the patient is kept quietly in this position for about one or two minutes. If the patient complains of vertigo the manipulations are to be discontinued.



FIG. 212. Nāgeli's headache manipulations.

In very many cases of congestive headache, especially that due to fever, the pain disappears at once after this manipulation, and the head becomes free. The procedure may be repeated in five or ten minutes, when in numerous cases the headache will be removed permanently, or at least will disappear for hours. If it should recur, there is nothing to prevent another recourse to this painless and harmless procedure. It should not be employed, however, for patients who are suffering from grave diseases of the heart, or for very debilitated individuals. Neither should the manipulations be carried on recklessly, without a physician's orders.

If the headache is due to anemia of the brain, indicated by pallor of the face, a head-bending manipulation is often efficacious. The position of the hand and arms should be as in the preceding manipulation. The masseur should push the head of the patient in a horizontal direction, forward and downward. His forearms should be firmly supported against the shoulders of the patient, so as to execute a counter-pull. After 60 to 90 seconds the head is slowly brought back into the regular position. By this procedure the veins of the throat are given a horizontal direction, or are even inclined downward, thus enabling the blood to flow more easily and rapidly through the blood-vessels. Hence, the head-bending manipulation causes a better flow of fresh blood through the brain. In order to continue its efficiency, this manipulation should be repeated after ten to fifteen minutes; for about one minute.

Careful and detailed treatment is necessary in cases of obstinate nervous headaches which occur in persons who possess a nervous predisposition, and in individuals who have become nervous owing to mental or physical overexertions. Such obstinate conditions may be due also to excesses, unsuitable nourishment, or to injurious occupations. Headaches which can be directly traced to any specific bodily ailment likewise require special treatment.

The first principle is to find the cause, and to remove it. Rational nourishment, abstinence from alcohol, and suitable clothing and occupation are the chief conditions of success. These are assisted by hydrotherapeutic, electric, or climatic influences. Many patients require special treatment of the eyes, nose, or ears, as an affection of any of these organs may be the cause of the headache. Constipation is one of the most frequent causes of this affection. In such a case the treatment should be dietetic rather than medicinal. See CONSTIPATION.

HEALTH-CARE OF CHILDREN.—Under this heading shall be given only a few hints with regard to the proper care of children more than one year of age, a thorough discussion of the care of babies being found under NURSING. When children enter upon their second year of life a radical change may be made in regard to their nourishment. They may be given eggs, soups, vegetables, fruits, and lean meat. Wine and beer should under

no circumstances be given to children under fourteen, and even then it is better that they abstain from these beverages. Coffee and tea, well diluted with water or milk, may be given to children after the fourth year of age. Pure fruit juices (lemon and raspberry), mixed with water, and sweetened with a little sugar, make wholesome beverages for young children. The daily fare of children between one and a half and two years of age should be made up about as follows: At 7 A.M., half a pint of milk; at 8.30, a soft-boiled egg or a raw egg stirred with a teaspoonful of sugar; at 11.30, a cup of soup or gruel, a slice of bread, and a small quantity of finely chopped vegetables; at 4 P.M., half a pint of milk, either pure or with the addition of a teaspoonful of cocoa; and at 7 P.M., some milk porridge prepared with rice, tapioca, or some other cereal. No food should be given after 7 P.M. Care should be taken not to accustom the children to an abundance of sweets. When children are about three years old, they may be allowed to eat at the family table, but should not be given any spicy or very salt foods.

In the course of the second year it is possible, by watchfulness and care, to train the children so that they announce when prompted by a call from nature. During the night, however, it often happens that even older children pass urine involuntarily. This condition is called "nocturnal enuresis," and its causes and treatment are fully discussed under **ENURESIS**.

The daily body-bath, which is a necessity for very young babies who soil themselves, is not absolutely essential for children who keep clean. Sponging with soap and cool water once or twice a day serves not only to cleanse the child's body, but also to harden it and increase its power of resistance against atmospheric changes (see **HARDENING**). Healthy children over three years of age may advantageously be given daily sea- or river-baths during the summer months, and they should be taught to swim at an early age, possibly when six years old. On pleasant days children should be allowed to stay in the open air as long as possible, and should be given opportunity to play in dust-free places with other children of the same age. No task which imposes a mental strain should be required of a child less than seven years old. A young school-child should not be kept too close to studies, and should be spared as long as possible from doing work at home. Lessons in music should not be given to children of less than ten years of age, unless special talents manifest themselves.

The requirements of sleep are greater in a child than in an adult. Nurslings are seldom awake for more than half an hour or an hour at a time; children between two and three years of age usually take a daily nap of 2 or 3 hours, besides sleeping 10 or 12 hours at night. Children between the ages of six and ten require at least 10 hours' sleep; children over twelve, 8 to 9 hours.

The children's room should be large, light, and airy, and easy to clean. The floor should be hard and smooth, and covered with matting, linoleum, or oilcloth. Walls painted with oil-paint are preferable to papered walls.

In winter an equable temperature should be maintained, and it is advisable to place a flat pan of water on the heating apparatus so as to keep the air sufficiently moist.

The dress of children who are old enough to run about and play, should be made as loose and comfortable as possible. No restricting bands, no tight collars. The shoes should be waterproof and broad-soled, and large enough for comfort. The stockings should not be held up by means of elastic bands encircling the legs, as these tend to impede the circulation of blood. Hose-supporters fastened with clasps to the front part of the stockings and attached to the upper part of the child's underwaist are advisable (see Fig. 213). To accustom little girls to wear corsets must be especially warned against, as the corset not only retards free respiration, but even displaces and compresses internal organs (see DRESS). By dressing children so that they can move and develop their muscles with perfect freedom, by encouraging them in wholesome plays and sports, and by endeavoring to cultivate at all times "clean minds in clean bodies," three of the most essential requirements for the making of good men and women will have been observed.

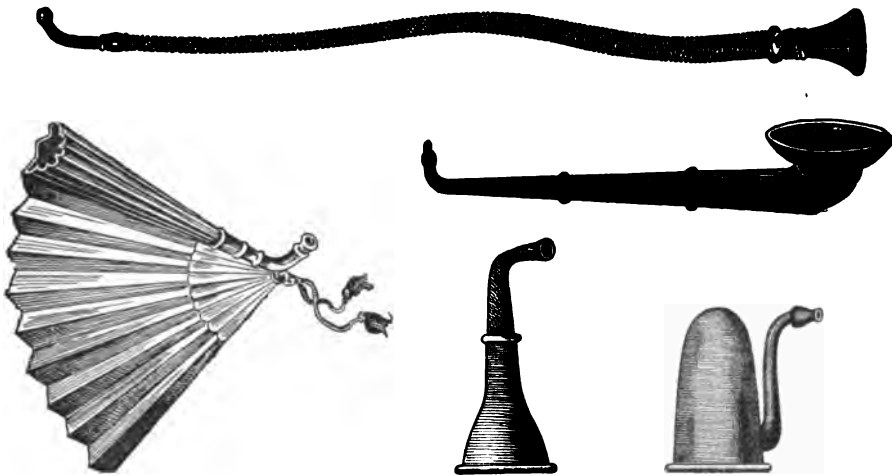


FIG. 213. Sensible hose-supporters.

HEARING, DEFICIENCY OF.—More or less marked disturbances of the faculty of hearing may exist as a hereditary affection. This is particularly true in cases which are unaccompanied by suppurative or inflammatory processes. Deafness of one ear may remain undiscovered until each ear is tested separately. The normal ear is able to understand words softly spoken at a distance of sixty feet; but the circumstance that a whisper is not heard beyond a distance of eighteen feet does not necessarily indicate deficiency of hearing. It often happens that persons who are hard of hearing can perceive the sounds of talking without being able to understand what is said, as the syllables and tones sound confused.

A perforation of the drum-membrane, not accompanied by the discharge of pus, does not necessarily affect the hearing to any great extent. Serious involvement of the membrane, however, will always cause defective hearing, because the sound-waves will then fall directly upon the auditory apparatus in the labyrinth, without being modified or regulated. In such cases an artificial drum-membrane, made of a wad of cotton, and introduced into the perforation, may afford relief to some patients. It subdues the sound-waves and prevents excessive tone impressions.

Running of the ear always affects the acuity of hearing, and should never be treated lightly. Swelling of the tonsils, particularly of the pharyngeal tonsil, disturbs normal breathing through the nose, and clogs the Eustachian tube; unless removed in time it will cause deficiency of hearing. In certain diseases defective hearing, or even deafness, may appear without any apparent suppuration; as, for instance, in abdominal typhoid, meningitis, whooping-cough, mumps, etc. Deafness may appear also after severe hemorrhages, and in consequence of injuries to the head, with or without fracture of the skull. Old age is usually attended by a certain



FIGS. 214-218. Various forms of ear-trumpets.

degree of deficiency of hearing, the high notes being the first to become difficult of perception.

Ear-trumpets seldom give satisfactory results. A trial may be made with the several varieties (see Figs. 214-218) to see which one will best answer the purpose for which it is intended. Screaming into an ear-trumpet affects the patient disagreeably; and when speaking into such an instrument one should talk neither too loudly nor too slowly, but distinctly and naturally. Prolonged conversation with persons who are hard of hearing is very trying and fatiguing for the voice. The frequent habit of lip-reading among the deaf is discussed in the article on **SPEECH DISTURBANCES**.

The various devices, apparatus, and methods, advertised in newspapers as being able to cure all cases of defective hearing, are to be most emphatically denounced. The money spent on these is invariably wasted, and it is always better to consult a physician than to invest in any of these so-called "unfailing remedies."

HEART.—For the structure and functions of this organ, see **THE CIRCULATORY SYSTEM** in **INTRODUCTORY CHAPTERS** (pp. 60-61).

HEART, DISEASES OF.—As pointed out in the chapters on anatomy, the heart is to be considered as a two-sided, muscular pump. On one side it pumps blood into the lungs to be aerated—the lesser circulation; on the other it pumps blood into the arteries to be carried to all parts of the body—the greater circulation. The movements of the two sides are coordinated by the cardiac nerves. Hence disease may make itself manifest in at least three different parts of the organ. It may affect the muscular walls of the heart; it may involve the valves of the heart; or the nervous mechanism that causes the harmonious beating of the two sides of the heart may be interfered with.

Affections of the muscular walls result as a rule either from excessive action of the heart (as is seen in athletes, soldiers who make forced marches, laborers who lift heavy weights, etc.) or from the injurious effects exerted by poisons upon the muscle tissue. Alcohol, tobacco, syphilis, etc., are among the most frequent causes; while the poisons of acute infectious diseases (pneumonia, typhoid fever, etc.) also exercise a marked effect upon the heart-muscle. Diseases of the valves may be due to defects in their mode of formation at birth; to the growths of micro-organisms (as in acute articular rheumatism, scarlet fever, pneumonia, typhoid, etc.); or to the deleterious influences of the syphilitic virus. The nervous defects are numerous. Distention of the stomach, indigestion, fear, worry, and over-work—all exert their influences upon the nervous mechanism. In some disorders (as **EXOPHTHALMIC GOITER**) excessive rapidity of the heart-beat may be noted; while in other diseases the opposite is observed. Only the more important heart-disorders can be here considered.

Inflammation of the Heart-Muscle.—Acute inflammation of the heart-muscle may occur in the course of infectious diseases (such as articular rheumatism; typhoid fever, scarlatina, pneumonia, diphtheria, influenza, puerperal fever, and septicemia), in connection with inflammation of the pericardium, or, rarely, as a consequence of excessive physical exertion.

Chronic inflammation of the heart-muscle, by which the musculature is transformed into callous and tendinous connective tissue, may either result from the acute form, or may develop in consequence of poisoning by alcohol, lead, or tobacco, or as a result of syphilis, gout, diabetes mellitus, chronic inflammation of the kidneys, malaria, or inflammation of the pericardium. This disease includes also that form of degeneration of the heart-muscle which occurs in general arteriosclerosis in consequence of an affection of the coronary vessels of the heart. These vessels supply the heart with blood. But inasmuch as the heart can be nourished only during the intervals of rest, it follows that continuous demands upon this organ will lead to an impairment of nutrition. Such excessive demands are made upon the heart when it is called upon to overcome the great resistance offered to the circulation of the blood in consequence of calcification of the arteries.

A similar overtaxation of the heart arises owing to the increased amount of water which is present in the blood in chronic inflammation of the kidneys. The excessive use of cold baths, constant mental emotions, and severe physical overexertions (including excessive gymnastics) likewise increase the labor of the heart. Excessive physical exertions may also lead to a rapidly appearing dilatation and relaxation of the heart-muscle, with all the symptoms of cardiac weakness; or they may cause a gradual enlargement of the heart with thickening of its walls. See *Enlargement of the Heart*.

Affections of the musculature of the heart manifest themselves principally in certain changes of the pulse. Further signs of a weakened activity of the heart-muscle consist in shortness of breath, oppression of the chest, rush of blood to the head, ringing of the ears, vertigo, headache, insomnia, blue discoloration of the skin, and bronchial catarrh. If the heart itself has become appreciably weakened, the same manifestations occur as described under *Defects of the Valves of the Heart*.

Defects of the Valves of the Heart.—The thickening, calcification, or shrinking of the valves brings about a condition which prevents their closing. This may give rise to an increased supply of blood to one or the other portion of the heart. Owing to adhesions and ring-shaped calcifications, a narrowing of the valvular openings may take place which prevents one or more portions of the heart from completely emptying their contents. Both of these conditions—imperfect closing, and permanent opening—modify the entire circulatory mechanism, and cause severe disturbances of the normal movement of the blood-stream. In its endeavor to compensate for these disturbances the heart performs an increased amount of work. This will either cause its muscular walls to become thicker (enlargement, or hypertrophy, of the heart); or it will give rise to enlargement of certain chambers of the heart, which may occasionally assume great dimensions, causing dilatation of the entire organ.

The heart is often able to carry on this increased amount of work for decades without relaxing. But as soon as the increased muscular power of the heart becomes insufficient, very pronounced manifestations of cardiac weakness develop. These signs are characteristic also of many other affections of the heart. The speed of the blood-current decreases throughout the capillaries, and symptoms of congestion develop in all organs. This causes blood-serum to escape into the tissues, giving rise to the condition known as DROPSY. The skin covering those parts of the body which are remote from the heart becomes cool and dry, and of a bluish discoloration; the veins of the skin become more markedly dilated; and the lungs become congested because of an increased supply of blood, thus giving rise to difficulty in breathing. At times a painful cough develops, with profuse expectoration of reddish, often bloody, sputum. Palpitation of the heart is an early symptom of weakness, and constant sensations of oppression

and fear prevail. The condition may cause disturbances also of the alimentary functions; and the urine usually becomes highly concentrated, and is voided in very small quantities.

Valvular defects of the heart are brought about, especially during childhood and adolescence, by a number of infectious diseases. In these affections the bacteria circulating in the blood, or their poisonous secretions, may cause new growths or inflammatory changes in the valves. This is very frequently the case in articular rheumatism and in septicemia. Although of less frequent occurrence in diphtheria, scarlatina, pneumonia, chorea, typhoid fever, erysipelas, and gonorrhea, it should always be thought of as a possible complication in these diseases. A calcification of the main artery (the *aorta*) may, especially in advanced age, extend into, and cause defects of, the valves of the heart. Valvular defects are very rarely congenital; and they are seldom due to external injuries to the chest.

In many cases of cardiac valvular defects the condition does not become manifest at the onset, especially when the existing disturbances are fully compensated for by the increased activity of the heart. It is possible, therefore, that such a defect may remain unobserved for a long time. In advanced cases the characteristic symptoms may arise during temporary or permanent attacks of cardiac weakness. It is possible to afford a considerable amount of comfort to patients suffering from such valvular disturbances, particularly when they are present in the milder degrees. Even very sick patients may be greatly benefited. See *General Rules for the Prevention and Treatment of Heart-Diseases*.

Enlargement of the Heart.—This condition may result from a thickening of the walls of the heart, or from a widening of the heart-cavities (dilatation). These morbid conditions of the heart are usually associated with each other. They may affect either the entire heart or only a part of it; as, for instance, the right or the left chamber. The chief causes of enlargement of the heart are valvular defects, and calcification of the arteries (*arteriosclerosis*). Inflammation of the kidneys, expansion of the lungs, constant bodily overexertion, high living, alcoholism, and permanent mental excitements are other potent causes. Dilatation of the heart may occur from the same causes, and may develop also as a result of inflammation of the heart-muscle (*myocarditis*), or in consequence of severe febrile affections, as typhoid fever or pneumonia. Acute dilatation frequently occurs during the excess of athletic exercises. The principal disturbances experienced by the patient are shortness of breath with attacks of dizziness and fainting. For principles of treatment, see *General Rules for the Prevention and Treatment of Heart-Diseases*.

Fatty Degeneration of the Heart.—This affection is due to certain changes in the heart-muscle, induced by excessive fat, and giving rise to uniform symptoms. One form, the so-called "fatty heart" (usually a part symptom

of general obesity), is brought about by the excessive deposit of fat below the heart in the pericardium, or by an infiltration of the fat between the muscle-bundles of the cardiac muscle. In the former case the heart is pressed upon by the pericardium; in the latter, its activity is impaired by a diminution of the firmness and strength of its muscle.

Another form of this affection consists in a fatty degeneration of the heart-muscle itself. This may be due to a disturbance of nutrition which may develop as a further consequence of fatty heart; or it may be an independent affection, at times arising from poisoning (as by arsenic, antimony, phosphorus, alcohol, or tobacco). In this form of the affection the fat is not deposited between the muscle-bundles, but the muscle substance itself is transformed into fat. The affection may arise also as a result of calcification of the coronary arteries of the heart, in severe diseases of the blood, or as a consequence of constant overexertion in the presence of an enlarged heart. Certain infectious diseases, as puerperal fever, typhoid, diphtheria, smallpox, malaria, and tuberculosis, may likewise give rise to fatty degeneration of the heart.

The symptoms due to fatty degeneration of the heart are: palpitation, sensations of fear and oppression, shortness of breath, changes of the pulse, etc. These manifest themselves even when the body is fully at rest, but are intensified after the slightest bodily exertion, and upon mental work and excitement. Measures tending to overcome this affection are primarily directed toward combating the general obesity. Antifat cures, undertaken by the patient on his own responsibility, are apt to be exaggerated, and may often be followed by injurious consequences. Thus, if the fatty cushion of the heart is made to disappear rapidly, the heart loses a support, and relaxation and dilatation of the organ are very liable to arise. The diet should be restricted principally to meat, vegetables, and fresh fruit; whereas starchy foods, sugar, and large quantities of fluid should be avoided.

Palpitation of the Heart.—Even under normal conditions the activity of the heart is influenced by the individuality of its possessor. Age, disposition, emotions, etc.—all exert their various influences upon this organ. It is not only the mental emotions or physical exertions, however, which manifest an action upon the heart; for, owing to the intimate correlation existing between this organ and all the other viscera of the body, most physical and nervous affections are accompanied by deviations from the normal heart-beat. Palpitation of the heart becomes of importance when a disturbance of the rhythm occurs in addition to acceleration and intensification of the heart-beats, or when it sets in upon the slightest bodily exertion, unaccompanied by any other external cause. Besides being an early symptom in almost all diseases of the heart, palpitation is noted principally during fever, in anemia, and in many cases of poisoning.

Very frequently the palpitation is a purely nervous symptom, being

present regularly in anemic, excitable, or nervous individuals. It consists in a more or less marked increase in the rate of the heart-beat. This comes on in attacks, and is associated with vertigo, headache, sensations of fear and oppression, pains in the region of the heart, flushed face, and increased perspiration. Women are especially liable to such attacks during the periods of adolescence, menstruation, and the menopause. Palpitation often results from too good living. Overfilling of the stomach, accompanied with digestive disturbances, is the most important cause. Other causative factors are: constipation; hemorrhoids; sexual excitement; excessive use of tea, coffee, alcoholic beverages, or tobacco; exophthalmic goiter; and convalescence from severe, especially febrile, diseases. Thus it may be seen that cardiac palpitation may be the expression of a trifling disorder, or the result of grave disease. To determine the exact cause of palpitation requires the best medical skill obtainable.

Spasm of the Heart (Angina Pectoris).—An affection which is characterized by sudden acute pains in the region of the heart, occurring without any external cause. These pains are usually excruciating, and often radiate into the left shoulder and left arm, frequently causing sensations of cold or of numbness in these parts. The patient has a feeling as if the heart were held in an iron grip by an invisible hand, or were being torn to pieces. The pains may become so violent that they almost suggest a wish for the destruction of life. At the same time there are usually present a marked feeling of oppression, a sensation of fear, shortness of breath, changes of the pulse, pallor of the face, and cold perspiration; fainting spells and convulsions are not as frequent. The affection occurs as a result of calcification and dilatation of the arteries, in defects of the valves of the heart, and in affections of the heart-muscle; but it may be due also to gout, hysteria, and neurasthenia, or to the effects of severe colds, mental emotions, physical overexertions, and the abuse of alcohol and tobacco.

The disease occurs generally in persons of advanced age, although those afflicted with true angina pectoris rarely attain a higher age than 55 or 60 years. Active medical treatment is imperative. The discussion of the prevention and treatment of this affection will be found in the following paragraphs on *General Rules for the Prevention and Treatment of Heart-Diseases*.

General Rules for the Prevention and Treatment of Heart-Diseases.—The prevention of affections of the heart can be accomplished only by constantly guarding against their causes. Against many of these, however, medical science is at times powerless. The most important causes of valvular disorders are the infectious diseases. Measles, scarlet fever, acute rheumatism, and diphtheria are frequently the precursors of heart-affections. Hence it is imperative to make all efforts possible to avoid these infections. Healthful living, fresh air, exercises, and gymnastics are essen-

tial in developing healthy bodies. Cleanliness of the body and of the dress, abstinence from alcoholic drinks, and protective vaccinations are also important aids. Convalescing individuals should rest in bed as long as possible, and should carefully avoid even the slightest exertion. In case any disturbance of the heart is experienced, the physician should at once be notified, no matter how insignificant the matter may seem.

Although physical exercises in general are beneficial to the development of the body, they may exert an injurious influence upon the heart if indulged in to an immoderate extent. Sports which make excessive demands upon the activity of the heart should be entirely avoided unless the heart, by systematic training, has gradually been rendered equal to the extra exertion. Bicycling, rowing, mountain-climbing, etc., may exert a very deleterious influence upon the untrained heart, and may often cause permanent injury to the organ. Before indulging in any sport, it is therefore advisable to submit to a careful medical examination of the entire body.

Individuals suffering from affections of the heart should exercise great care also in the choice of a profession. Even slight valvular defects, which are compensated for by an increased activity of the heart, make it necessary to choose professions which do not make excessive demands upon the mental and physical activities. A quiet, sedentary occupation, free from mental worry and physical exertions, is in order for such patients. Occupations which require great strength, and above all a sound heart, should not be selected by individuals suffering from cardiac weakness. The constant and excessive use of drinks (coffee, tea, alcohol), and of tobacco, may likewise give rise to harmful consequences. Habitual overindulgence in the pleasures of the table is also apt to exert an injurious influence upon the heart.

The treatment of diseases of the heart should in all cases be entrusted to an experienced physician. In addition to sufficient sleep and rest, it is of advantage to take moderate exercise in fresh air, with frequent deep inspirations, in order to promote the circulation of the blood. The living-rooms, and especially the bedrooms, of persons suffering from heart-diseases should be large and airy, and must be ventilated several times a day. Equable climates at moderate elevations are preferable during summer, while southern maritime localities are to be recommended in winter. As a rule altitudes higher than 4,000 feet are not well stood by patients with weak hearts. The selection of a resort had best be left to the physician.

Cold ablutions with subsequent dry rubbings, and warm baths of about 86° to 91° F. are often of much service. Great extremes of heat and cold are to be avoided. The regulation of the stools is of great importance, as the straining due to a constipated condition is very harmful to the heart. The daily evacuation of the bowels should be assisted by eating a great deal of vegetables and fruits, by oil or water enemas, or, if necessary, by mild laxatives.

Mental or sexual excitement often exerts an injurious influence upon patients with heart-disease, and should be avoided as much as possible. With reference to women who suffer from heart-affections, the question of marriage should be considered, as the possibility of pregnancy, and its consequent increased demands upon the heart, is an important issue. When the valvular defects are well compensated for, and have caused no disturbances prior to marriage, the presence of a heart lesion is not necessarily a bar to marriage. The dangers are by no means as great as they are often assumed to be. But they may be called forth by repeated pregnancies, by mental emotions, and by physical overexertions. In such cases a rational mode of living, a well-regulated diet, and careful medical supervision are absolutely essential. If albumin is present in the urine of a pregnant woman affected with heart-disease, it is advisable that she drink from one to one and a half quarts of milk daily during the first six months, and two quarts daily during the last three months, even if the affection does not cause her any uneasiness. The urine should be frequently examined by the attending physician.

The dress should be neither too warm nor too light; and it should not in any way interfere with respiration or with circulation. Tight skirt-bands, corsets, tight garters, and narrow shoes interfere with the vital functions, and should not be worn by patients with weak hearts.

The diet should be carefully regulated. In affections that run a rapid course it should consist principally of milk, soft-boiled eggs, and rice boiled in milk. Strong soups, beef-tea, etc., are liable to irritate the heart. When the normal function of the heart has been restored, readily digestible, nourishing foods should be taken. Overfilling the stomach should be avoided, especially before retiring. Highly seasoned or fatty dishes, as well as starchy foods, should be omitted from the dietary of patients with weak hearts. Boiled milk, and fresh water (pure or mixed with fruit-juices) may be taken in moderate quantities. Mineral waters with excess of carbonic acid gas, strong coffee and tea, and all beverages containing much alcohol are strictly prohibited; the use of tobacco should likewise be entirely abandoned.

During attacks of palpitation, spasm of the heart, or shortness of breath, the patient should be given plenty of fresh air before the arrival of the physician. He should be divested of all tight garments, should occupy a half reclining posture, and remain absolutely quiet. Cold compresses or ice-bags may be placed upon the chest over the heart region. In marked palpitation of the heart, and in cases of constant painful or oppressive sensations in the cardiac region, the application of pressure to the chest in the region of the heart often proves beneficial. Sudden weakness of the heart, with a tendency to fainting, requires the administration of strong black coffee, brandy, or wine. It is advisable also to rub the body with hot towels,

or to apply mustard-poultices or plasters to the region of the heart. Hot foot-baths or hand-baths also have a favorable action.

In addition to the general directions for patients suffering from heart-diseases, a number of special treatments are of service; the selection of these, as well as of the medicines, must, however, be left to the physician. Among climatic resorts worthy of recommendation may be mentioned the following. In *Europe*: Nauheim, Cudowa, Franzensbad, and Marienbad. In the *United States*: Hot Springs, Va.; Mt. Clemens, Mich.; Glenwood Springs, Col., and Watkins Glen and Dansville, N. Y. The saline sulfur baths of Frenchlick Springs (Indiana) are advisable, especially for patients afflicted with heart-diseases which continue to cause disturbances (such as palpitation, oppressions, shortness of breath, etc.) although the defect has been compensated for by increased cardiac activity.

Among other special methods of treatment, mention may be made of dietetic cures (milk, whey, or grapes), which are especially indicated in patients who are inclined to obesity; mechanical treatment with massage of the chest, arms, and legs, in order to facilitate the circulation of blood; and resistance gymnastics. The pharmacopœia also contains excellent remedies which, by increasing the blood-pressure and strengthening the heart, are capable of removing even severe symptoms of cardiac weakness.

HEARTBURN.—An accompanying symptom in various diseases of the stomach. It consists in a disagreeable burning sensation in the esophagus, accompanied with sour eructations which are repeated every few minutes. As a rule this belching is most severe directly after a meal, and it may continue for an hour or more. The cause of heartburn is the development in the stomach of abnormally large quantities of acids (particularly hydrochloric acid), due either to fermentation of food or to abnormal irritation of the nerves which cause the elaboration of the gastric juices.

Since heartburn is a symptom only, and not a disease in itself, it follows that treatment must be directed to the fundamental causes. To diagnose these is the mission of the physician. Great care should be exercised with regard to the diet, and as a general rule it may be said that fatty foods, acid drinks, spices, onions, cheese, radishes, eels, salmon, crabs, lobsters, coffee, and alcoholic drinks are to be avoided. Bicarbonate of soda affords immediate relief in this condition, but should not be used to excess. The treatment had best be left to the physician.

HEAT-STROKE.—A transitory, morbid condition brought about by overheating the body in consequence of excessive muscular activity in hot and sultry air. It occurs principally as a result of forced marching and during exhaustive work in very warm weather. In contradistinction to **SUNSTROKE** (which see) it may occur also when the skies are clouded. Persons affected by heat-stroke become unconscious, are attacked by convulsions, and have excessively high temperature.

A patient suffering from a heat-stroke should immediately be placed in a shady place with his head in an elevated position. If necessary, shade must be produced by the aid of umbrellas or other suitable objects. The patient's garments should be loosened, and he should be vigorously fanned. It is desirable to pour cold water over him, or to apply ice-bags to the head and to the region of the heart. If the patient is able to swallow, cold water may be given in large quantities. In severe cases artificial respiration may be necessary.

In order to prevent heat-stroke it is necessary to drink plenty of water during a march or when working, to rest as often as possible in shady and airy places, to wear loose-fitting garments, to cool the head by frequent flushings with cold water or by fanning, and, above all, to avoid alcohol in any form. If dizziness or other signs of weakness appear while walking or working, immediate rest is requisite.

HEDEOMA (PENNYROYAL).—The dried leaves of *Hedeoma pulegioides*, a low annual herb found throughout the eastern portion of the United States. It contains a very active volatile oil, rich in phenols; and it has a very marked action on the lower intestinal canal as well as on the uterus. It has been widely used as an aromatic for stomach disorders, and at times it has been foolishly employed by the laity for the purpose of inducing abortion. Used for this purpose it is successful in causing very severe poisoning without bringing about the desired result.

HEMATEMESIS.—Vomiting of blood, resulting from the rupture of a blood-vessel in the wall of the stomach. The expelled blood is usually dark in color and somewhat lumpy. The amount of blood vomited varies greatly. Sometimes mere traces are present in the vomitus; in other cases it appears in drops or streaks; at other times quantities varying from a teaspoonful to a cupful may be vomited; and in certain instances as much as a quart of blood has been observed. Very often the blood is mixed with mucus or with particles of food; it may, however, be vomited perfectly clear, and is then of a pronounced dark red color. It may be difficult even for a practised physician to decide whether such an expulsion of blood emanates from the stomach or from the lungs. Gastric hemorrhages usually result from the destruction of a gastric blood-vessel by an ulcer of the stomach; but they may be due also to a congestion of blood in the stomach, such as frequently occurs during a diseased condition of the liver. Part of the blood finds its way into the intestine, and produces dark discoloration of the stools.

In the presence of a gastric hemorrhage the first thing to be done is to put the patient to bed and insist on absolute rest in order to avoid further loss of blood, which under certain circumstances may endanger life. The patient should remain in bed for two or more days according to the severity of the bleeding. An ice-bag may be placed over the stomach, and ice administered in small pieces. The diet should preferably consist only of very

cold milk in small quantities. The administration of hemostatic drugs must be left to the physician. The condition of anemia which is sure to follow such hemorrhages, and which sometimes persists for weeks and months, requires particular attention according to the principles laid down for the treatment of this affection (see ANEMIA). A physician's aid is indispensable.

HEMATURIA.—Hemorrhage from the mucous membranes of the urinary passages, usually from the kidneys, ureters, bladder, or urethra, in the order named. The presence of blood in the urine gives the latter a dirty red color. Hematuria is a sign of varied importance. It occurs regularly in acute inflammations of the kidneys; less often in the chronic cases of this disease. Other diseases which may be accompanied by hematuria are: Renal tuberculosis and cancer, stones in the kidney, many cases of poisoning, severe cystitis, vesical calculi, tumors of the bladder, and ruptures of dilated blood-vessels in the bladder. A bloody condition of the urine is endemic in certain countries, such as Egypt, where it is due to the presence of parasitic worms (*Bilharzia*) in the blood-vessels of the bladder, these parasites depositing their eggs in the mucous membranes of the urinary passages. The symptoms may be caused also by the presence in the urine of dissolved hemoglobin.

HEMERALOPIA.—Night-blindness. This condition is due to a morbid, sometimes congenital, affection of the retina and optic nerve, which causes the eye to become insensitive to dim light, so that vision is totally or partially lost as soon as twilight sets in. The condition may be due to prolonged exposure to very brilliant light, or it may be caused by disturbances of nutrition. As a rule there are no evidences of this disease visible under the ophthalmoscope. Hemeralopia may occur in soldiers marching for a considerable length of time in strong sunlight, or in firemen working continuously in front of a furnace. It is of more frequent occurrence in the tropics than in temperate zones.

HEMLOCK-POISONING.—A characteristic form of poisoning caused by eating the poison hemlock (*Conium maculatum*) which may be confused with parsley, celery, or parsnip. The symptoms are vomiting, pains in the stomach and intestines, staggering, dizziness, a sensation of cold and of heaviness, and paralysis of the legs and of the muscles governing respiration. The treatment consists in the administration of enemata and of artificial respiration.

The withered leaves of hemlock have a disagreeable smell, resembling that of mice. Its root is cylindrical, fibrous, hollow, and divided into partitions by transverse walls. The taste is at first sweetish, later acrid. Parsnip and parsley have fleshy roots of a sweet, aromatic taste; the dried leaves of the latter have no smell. The root of celery is round (turnip-shaped) and of a sweet taste. Compare illustrations on Plate XXIII.

HEMOPHILIA.—Term referring to a rather uncommon condition which is characterized by such a marked tendency to hemorrhage that even a slight wound in any part of the body may cause the individual to bleed to death. The real cause of this strange condition has never been satisfactorily explained. Although numerous observations have shown that extraordinary thinness of the walls of the blood-vessels, and their consequent liability to become readily ruptured, may partly account for the production of these hemorrhages, there is no doubt that this cause is supplemented by some abnormal condition of the blood whereby its ability to coagulate is impaired to such an extent that small openings in the blood-vessels are not closed by clots as occurs under normal circumstances. All observers agree, however, that the disease is hereditary in character. Cases are known of entire families in whom the tendency seems to have been transmitted through a healthy mother to her sons, while the daughters have remained unaffected, although they later have become the mothers of sons who were likewise afflicted.

Hemophilia seems to be especially a condition of early childhood and adolescence, gradually abating later in life; and if proper precautions are taken to protect such children they may attain a ripe age in spite of their affliction. Preventive measures are, in fact, the main essentials in these cases. The patient must be warned that the slightest prick with a needle or a pin, active brushing of the teeth, or continued sneezing or hawking, may cause a hemorrhage so serious that it may baffle every known method of relief. In these cases even small hemorrhages must be regarded as serious, and a physician called at once. General good health and a sensible mode of life greatly aid in diminishing the tendency to such abnormal bleeding. Internal hemorrhages are less frequent, but must nevertheless be guarded against. It is ordinarily sufficient that the subject of hemophilia be warned against the dangers attendant upon wounds of even the smallest blood-vessels, such as may be produced by perforating the ears, by minor operations, or even by corporal punishment. For this reason it is well to notify the instructor of such a child of its condition, and to see to it that especial precautions be taken during gymnastic exercises. In order to avoid extensive dental operations, the mouth and teeth should be thoroughly cared for from early youth. In choosing an occupation, such callings should be avoided in which injuries (even of a minor character) are liable to occur, and those selected which call for but little bodily exertion. Patients suffering from this condition should never be permitted to enter military service.

HEMOPTYSIS.—Coughing of blood. Blood may be coughed up with the sputum in the form of little specks or streaks, or it may be found thoroughly mixed with the sputum. Sometimes the expectoration consists entirely of blood. Blood from the lungs may be distinguished from bloody

vomit by the fact that blood from the stomach is dark red and lumpy, whereas that derived from the lungs is bright red and frothy. Furthermore, the blood coming from the lungs is expelled by coughing, while that from the stomach is vomited. Mistakes may readily occur, as blood coming from the nose, pharynx, or gums, may be first swallowed and then vomited. Even the most careful examination may sometimes fail to reveal the true state of affairs. The coughing of blood is usually a result of pulmonary tuberculosis, in which disease it is produced by the rupture of blood-vessels in the lung. The sudden appearance of blood in the sputum of an apparently healthy person may often serve as the first indication of the presence of this disease. Among other, more or less common, causes of hemoptysis may be mentioned severe irritation of the mucous membrane of the bronchi, injuries to the respiratory organs (such as contusions of the chest, or fracture of the ribs), certain diseases of metabolism (such as purpura and scurvy), rupture of the aorta into the respiratory passages, and tumors or parasites in the lungs. Mere bloody stains in the expectoration may occur from numerous other causes.

Preliminary to an attack of hemoptysis the patient experiences a feeling as if a warm fluid were making its way up behind the breast-bone. This is followed by a sweetish or salty taste in the mouth, whereupon the blood is brought up by hawking or coughing. Some persons are thrown into a paroxysm of fear on the appearance of even slight traces of blood in their sputum. Although this fear is often unfounded, it is wise to submit to a careful physical examination by a physician, in order that the patient may be reassured if no danger be present, or that prompt treatment may be instituted if necessary.

Although rarely fatal, hemoptysis should always be regarded as a serious symptom which requires immediate medical attention. Before the arrival of the physician, the patient should observe absolute rest, preferably in bed; he may take small pieces of ice, very cold lemonade, or salt water (2 to 3 teaspoonfuls to the glass). The tendency to cough should be repressed. Hot drinks and alcoholic beverages must be entirely omitted. The various teas recommended for this condition on account of their pretended astringent action are absolutely useless. The fact that the most severe hemorrhages come from ruptured vessels, which have entirely lost the power to retract, makes it plainly evident that such recommendations are entirely devoid of a scientific basis. In the presence of constantly recurring hemorrhages it is advisable to apply fairly tight bandages around the middle portions of the arms and legs. These bandages produce congestion, thus reducing the blood supply of the lungs to a certain extent.

HEMORRHAGE AND ITS CONTROL.—Hemorrhage is the general term for bleeding, or for a loss of blood, from the blood-vessels. Distinction must be made between internal and external hemorrhages. The loss of blood



FIG. 219. Bleeding from a vein.

may be slight, as in the cases of nosebleed and insignificant cuts; or it may be extensive, as in the bleeding that may occur from ulcer of the stomach. Hemorrhage may be a normal physiological process (as, for instance, the recurring bleeding of menstruation), but in the great majority of instances it is a pathological process. Many persons bleed very freely on slight provocation, and are always in danger of fatal hemorrhage. See HEMOPHILIA.

The causes of hemorrhage are very numerous, but for the layman the most important types of bleeding are those due to accidental cuts. Here it is essential to recognize the character of the blood-vessels injured, whether veins or arteries. The so-called "blue venous blood" is largely a fiction. The difference in color of venous blood and arterial blood is in reality very slight, and as oxygenation rapidly takes place in the air, venous blood (which is only a shade darker than arterial blood) is rendered lighter. If the injured blood-vessel be a superficial one, the difference between the steady oozing from a vein (see Fig. 219) and the pulsating outflow from an artery (Fig. 220) is readily perceived; but if the wound be deep and partly blocked by clots and cut flesh, the pulsations from a bleeding artery may not be readily noticed. In attempting to stop a flow of blood it is of importance to remember that in veins the current of blood is in a direction opposite to that in the arteries. In the latter vessels the blood is propelled intermittently away from the heart toward the extremities; in the veins it flows uninterruptedly from the extremities toward the heart. Therefore, when it has been definitely deter-



FIG. 220. Bleeding from an artery.

mined whether an artery or a vein has been cut, compression must be made accordingly. If an artery has been injured, compression must be made on that side of the wound which is nearest the heart; if a vein, on that side of the wound which is furthest away from the heart. When both types of vessels have been severed by the same cut, compression on both sides of the wound may be necessary.

In the case of every bleeding injury, great care must be taken not to infect the wound. Whatever comes in contact with the wound (whether

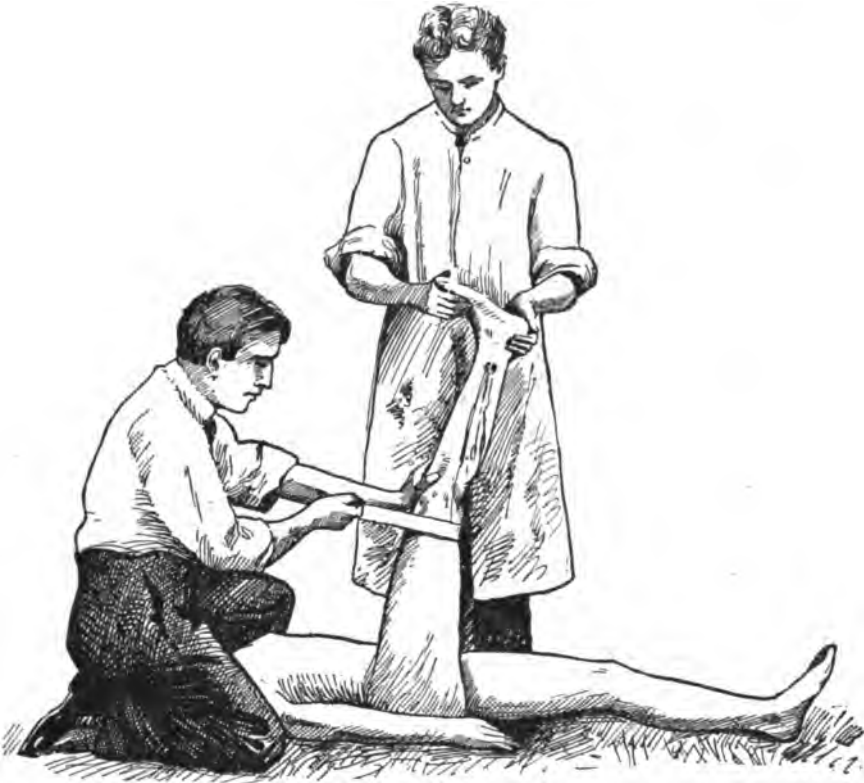


FIG. 221. Application of bandage to arrest bleeding.

it be the hands, the dressing-material, or the bandages) must be thoroughly cleansed and, if possible, sterilized. A moderate bleeding may be stopped by applying a compress of surgical cotton or gauze to the wound, holding it in place with the fingers or with a snug bandage. If neither cotton nor gauze is at hand, a piece of clean linen, or a handkerchief folded several times, may be used. The application of various remedies, such as pumice, plasters, cobwebs, etc., is dangerous rather than helpful, and should be avoided.

If the bleeding can not be controlled by the means just noted, it may be possible to do so by applying a suspender, a handkerchief, or a bandage

made from any material immediately at hand, around the injured limb (see Fig. 221). If greater pressure is desired, a lever may be inserted under the knot of the bandage, and a still greater constriction secured by twisting this (see Fig. 222). If the injured vessel be an artery, the pressure should be applied above the site of the wound. Where the hemorrhage takes place from a vein, the bandage must be applied from the hand or foot upwards, to a point above the wound, which is covered with a pad of gauze or cotton.



FIG. 222. Using a lever to twist a bandage.

(see Figs. 224 and 225). In hemorrhage from the thigh, the femoral artery can be pressed against the pelvic bone in the middle of the groin, when the leg is half bent. The best place on which to apply pressure on the upper arm is along the inner side, just below the biceps (see Fig. 226). A similar effect may be secured by compressing the upper arm between two sticks applied as shown in Fig. 227. Pressure for this purpose must not be kept up for a longer period than three or four hours; otherwise gangrene is apt to set in.

If an injured person be very much weakened from loss of blood, and is in a fainting condition, he should be given strong black coffee, wine, rum,

In localities where no bandage can be applied, the control of hemorrhage is a more difficult matter. In such cases it is advisable to press the bleeding artery against a neighboring bone with the finger. When the bleeding occurs on the forehead, the temporal artery may be compressed just in front of the ear (see Plate VII.); when it takes place from the neck, the carotid artery may be compressed in the groove between the larynx and the vertebral column (see Fig. 223); and if the hemorrhage occurs on the shoulder or in the axilla, it may be controlled by compressing the subclavian artery, and at the same time draw the arm downward against the first rib

whisky, or brandy. The head should be kept in a low position, and spirits of ammonia should be applied to the nostrils for inhalation.

Hemorrhage is a frequent complication of a number of diseases. The



FIG. 223. Pressure on the carotid artery.



FIG. 224. Pressure on the subclavian artery.

most important of these are ulcer of the stomach, cancer of the stomach, cancer of the intestine, tuberculosis of the lungs and of the throat, typhoid fever, and diseases of the womb. In ulcer of the stomach characteristic symptoms are present; such as pain, vomiting of food or of blood, or blood in the stools. Skilled medical advice is needed to stop the bleeding from an ulcer of the stomach, and the only help that the patient can offer before getting treatment is to keep as quiet as possible and take nourishment by the rectum only. Even water should not be swallowed. In cancer the diagnosis should be made early if medical help is to be of any avail. The symptoms of this condition are nausea, vomiting, loss of appetite, loss of weight, blood in the vomit or in the stools, and progressive anemia. If recognized early a surgical operation may save the patient's life; otherwise no help



FIG. 225. Compressing the subclavian artery by drawing the arm against the ribs.

is possible. The diagnosis of hemorrhage from the bowels is not readily made. When the blood is bright red the probabilities are that the hemorrhage is taking place low down in the large intestine. If the stools be black and tarry the inference is that the hemorrhage is from the upper

portions of the intestinal tract—the stomach, duodenum, or other portions of the small intestine. Any patient passing a black, tarry stool should keep such a stool for the inspection of his family physician, as hemorrhage from the bowel is often the early sign of gastro-intestinal cancer. The treatment of these affections is always surgical.

Hemorrhages from the throat and mouth always merit careful attention. Bleeding from the posterior part of the nose is often mistaken for bleeding from the lung; and occasionally blood that is vomited is thought to be coughed up. In true throat and lung hemorrhages the blood is usually bright red, and comes up either in small quantities or in large amounts.



FIG. 226. Applying pressure on upper arm to stop bleeding.



FIG. 227. Exerting pressure on upper arm by means of two sticks.

Such hemorrhages are due to the rupture of smaller or larger blood-vessels in the throat or in the lungs, and are important signs of pulmonary tuberculosis. The immediate treatment of such hemorrhages consists of rest, light diet, and some sedative. A small dose of opium is frequently helpful until the physician arrives. Not more than half a grain should be given.

Sudden perforation of an intestinal ulcer, with severe bleeding, is one of the grave accidents of typhoid fever. It usually occurs in the third or fourth week of the disease, and is evidenced by sudden spells of weakness, and by the presence of tarry or reddish material in the stools. In some cases surgical intervention is essential for the preservation of the patient's life; but many recover without surgical aid. The question of operation should not be lightly considered. Strict dietary treatment and absolute bodily rest are the "first aids" in this severe accident. See also the articles BLOODLETTING; BLADDER, DISEASES OF; BRAIN, APOPLEXY OF; MENSTRUATION; STOMACH, DISEASES OF; WOMB, DISEASES OF.

HEMORRHOIDS.—Nodular swellings of the blood-vessels (veins) at the lowest point of the rectum, inside or outside the anus. The disease, which is of very frequent occurrence in both sexes, generally sets in after the thirtieth year of life, although it may occur earlier. The significance of hemorrhoids is usually greatly overrated among the laity. The obsolete and erroneous opinion that hemorrhoids affect internal organs is widely disseminated; and the belief that these swellings were due to a disease has occasionally been the cause of serious consequences. It can not be too strongly emphasized that hemorrhoids are absolutely nothing but a local affection of the rectum, caused by the sluggish flow of the blood from this part of the body because of its distance from the heart. The blood overfills the veins, and swellings take place as a consequence.

The swellings, which at first may be the size of a small shot or a cherry-stone, may gradually attain the size of a plum, and are superabundantly filled with blood. Sometimes these swollen vessels surround the anus in the form of a ring, being arranged like a string of beads. In some cases only a single node is visible; in other cases several swellings are closely associated. The hemorrhoids are of a bluish-red color. In some cases they are located so deeply within the anus that they are not visible externally, and can merely be felt with a finger in the interior of the rectum. Such internal piles or hemorrhoids are sometimes present in addition to others which may be seen and felt externally. The distended blood-vessels do not always form nodular swellings, but frequently permeate the entire mucous membrane of the rectum as thick cords, their upper ends being visible only by aid of the rectoscope.

Hemorrhoids are very obstinate to treat. They develop very slowly and gradually, and may cause no disturbances until months or years have passed. It often happens that the first manifestation of the affection consists in hemorrhage from a ruptured node. The bleeding may consist of a few drops only; or as much as several teaspoonfuls, or even tablespoonfuls, may be passed. The hemorrhage generally recurs after days, weeks, or months. Some hemorrhoids bleed almost uninterruptedly for years, thereby often causing severe anemia, and pallor of the entire body. Another danger of such frequent hemorrhages lies in the fact that they weaken the resistance of the body, especially of the heart. The hemorrhages generally occur during defecation, owing to the strong downward and outward pressure of the rectum. Unfortunately, patients suffering with hemorrhoids are usually constipated, and are therefore compelled to strain very much at stools.

In addition to bleedings, hemorrhoids cause various other disturbances, such as frequent desires to evacuate the bowels, painful defecation, itching, and the passage of mucus and pus in consequence of frequently occurring inflammations of the mucous membrane of the rectum. It happens at

times that hemorrhoidal swellings become caught by the ring-muscle (sphincter) of the anus, so that they can be replaced in the rectum only with difficulty. Hemorrhoidal nodes which are situated outside the anal opening are always exposed to the danger of bacterial infection. They become inflamed, swell, suppurate, and may even become gangrenous. In that case they are a torture to the patient; and they interfere with walking, standing, sitting, and lying, still more than external hemorrhoids are prone to do under ordinary conditions. The irritation caused by the discharges from the rectum occasionally gives rise to considerable soreness of the skin surrounding the anus.

Hemorrhoids sometimes result from general disturbances of circulation (principally from heart-defects and diseases of the liver) which cause congestions of the blood-vessels, especially of the abdominal vessels. More frequently, however, they are due to purely local congestions, arising, for instance, in consequence of a sedentary occupation or of constipation. For this reason constant constipation is looked upon as one of the most frequent causes of hemorrhoids. The pernicious habit, met with especially in girls and women, of suppressing the stools on account of modesty, etc., often leads to severe constipation. The pressure of the fecal masses upon the blood-vessels causes distention and hemorrhoids.

It is easier to prevent hemorrhoids than to heal them. The principal condition is strict cleanliness of the anus, especially after evacuations of the bowels. Regular movements must be carefully attended to. If there is a tendency to constipation it is necessary to stimulate evacuation by observing care with regard to the diet, by physical exercise, or by taking laxatives or enemas. Regular and loose evacuations of the bowels are of the greatest importance for patients suffering from hemorrhoids. The anus should be carefully cleansed after evacuations by washing it with a sponge and drying it with a soft piece of gauze (paper should not be used), whereupon it should be greased with lanolin or vaselin. Prolapsed nodes should be pushed back with the fingers, care being taken that the nails are not long enough to injure the parts. In cases of constricted hemorrhoids cooling compresses made of aluminum acetate or of weak lead-water may be applied; warm sitz-baths of from 15 to 20 minutes' duration are also advisable. When several nodes are present, particularly if they are large, their removal can be accomplished only by surgical interference.

Bleeding resulting from hemorrhoids may be stopped temporarily, or even permanently, by internal styptics. More severe hemorrhages require local treatment consisting in cauterization of the bleeding parts, or in packing the rectum with iodoform-gauze. This, of course, is to be done by the attending physician. Cold sitz-baths often cause the vessels to contract so as to diminish the tendency to hemorrhages. These baths also act favorably upon the weakened intestine and upon the constipation. Open,

contaminated, and suppurating hemorrhoids must be treated by a physician according to modern methods. Dusting-powders or salves may be applied in order to alleviate the soreness of the skin in the neighborhood of the anus. Smaller nodes may occasionally be caused to contract and disappear by injections of carbolic acid; but larger ones can be removed only by extensive operations (cauterization, cutting, etc.). This is the only sure remedy. The numerous salves which are constantly being placed on the market, purporting to cure hemorrhoids "without the knife," are often very unsafe remedies.

HENBANE.—See HYOSCYAMUS.

HERB-BATH.—This is prepared by adding to the bath a decoction of aromatic herbs, the composition of which must be given by a physician. As an example may serve a combination of eight ounces each of camomile, peppermint leaves, and calamus root, boiled in two quarts of water and added to a full bath of a temperature of 95° F. This bath is suitable for women and children in conditions of irritation.

HEREDITY.—The transmission from parent to child of physical and mental characteristics, as well as of such peculiar traits and tendencies as are known by the term "idiosyncrasies." The inheritability of physical and mental qualities is evidenced in every family, but is not equally marked in all instances. As a general rule it may be said that these traits are transmitted through the generations in three distinct ways: (1) Transmission may take place directly from parents to offspring, the qualities of the former blending harmoniously in the child. This is called *direct heredity*. (2) The child may inherit the qualities of a more or less remote ancestor, either of the paternal or of the maternal line (*normal heredity*). (3) The physical and mental characteristics of an aunt, uncle, grandaunt, or granduncle may be inherited by a nephew or niece (*collateral heredity*). In addition to these three main avenues of heredity, there are various deviations, such as the inheritance by a child of all the qualities of one parent, but none of those of the other's; or a lack of blending in the child of the characteristics inherited, the maternal and the paternal traits being individually and distinctly traceable.

The inheritability of morbid tendencies is a question which can only be briefly touched upon in this place. Severe constitutional diseases, such as tuberculosis, syphilis, etc., are often transmitted directly from parent to child; and for this reason persons suffering from such diseases should feel morally obliged to forego marriage. A morbid taint on the part of the mother often seems more apt to be transmitted to the male offspring, while that of the father is chiefly inherited by the daughters. It must be pointed out that many diseases which are loosely spoken of as "hereditary," are in reality acquired by extraneous means, the fetus being infected with the virus of the parent's affection. Such diseases are properly termed "congenital." *Evolutionary heredity* is the term applied to the transmission to the fetus of

some moral or physical quality, owing to an extraneous cause affecting the mother.

Heredity is one of the most prominent among the factors causative of mental diseases. Such an inherited taint may remain dormant in the child until called forth by extraneous influences. The children of mentally deranged parents, or of epileptics or alcoholics, are very apt to be thus tainted; and the trait may even remain dormant in one generation to assert itself in



FIG. 228. X-ray picture showing dislocation of the right hip-joint. Star indicates position of socket.

the grandchildren of those originally afflicted. In many cases children with inherited taints may, by extreme watchfulness and care, be saved for useful lives, but in the larger number of instances some external factor generally brings out the inherited predisposition.

HERNIA.—See RUPTURE.

HERPES.—A general term applied to a variety of skin eruptions. *Herpes labialis*, or fever-sores, are usually due to digestive disturbances. This condition is best treated by taking a saline laxative, and by using an antiseptic local application, such as carbolic salve, camphor salve, etc. *Herpes Zoster* consists of an acute outbreak along a nerve-trunk of smaller or larger blisters, accompanied with pain. The blisters may coalesce and inflame, or they may remain separate and slowly dry up. This is a nervous affec-

tion, and is at times influenced also by intestinal disturbances. For *Herpes tonsurans* see RINGWORM.

HICCUP (HICCOUGH).—A condition due to spasmodic contractions of the diaphragm, caused by irritation of the diaphragmatic nerves. The clicking sound characteristic of hiccup is produced by the abrupt closure of the vocal cords after each indrawing of air. In little children hiccup may often be checked by means of a snug bandage around the abdomen; or (in children more than one year of age) a drop or two of Hoffmann's anodyne may give relief. In adults the condition is frequently due to some disturbance of digestion, which may be readily relieved by taking a teaspoonful of Hoffmann's anodyne. In most cases hiccup is but a trivial affection, which usually passes off of its own accord in a few minutes.

HIP-JOINT, CONGENITAL DISLOCATION OF.—A malformation of the hip-joint, in which the head of the thigh-bone, instead of being situated in its socket in the pelvis, is placed outside the socket, either in front of it or behind. The deformity may affect one or both sides; and girls are more frequently afflicted than boys. If the defect be not treated it results in marked disturbances of walking. A one-sided dislocation (see Fig. 228) makes one leg shorter than the other—sometimes very considerably so—and the patient limps very conspicuously. A dislocation of both sides (see Fig. 229) does not produce a limp, as both legs are affected equally much. The walk, however, becomes clumsy and waddling because the heads of the thigh-bones are not supported in their sockets. The pelvis is depressed, the lumbar region of the back becomes hollow, and the projecting heads of the thigh-bones form humps on the buttocks. Patients suffering from dislocation of the hip-joint are unable to walk very much; they tire readily even if they suffer no pain.

Formerly it was not thought possible to do much toward relieving this condition, and treatment was restricted to the wearing of thick-soled shoes, and of corsets and apparatus. At the present time, however, the defect is treated operatively, usually by the so-called "bloodless" operation, which consists in reducing the dislocation by manual strength (the patient being under the influence of an anesthetic), whereupon the limb is placed in a plaster of Paris cast to hold it in position. It is desirable to correct the deformity as early as the first or second year; and the parents of a child



FIG. 229. Bilateral hip-joint dislocation.

that limps should not delay to have it examined by a physician. In some cases an open operation will be found necessary, but only a surgeon is able to decide this point.

It should be remembered that a normal gait is not always obtained. Improvement is the rule. Complete success is sometimes rendered impossible by the structure of the head of the thigh-bone, and by the circumstance that the socket is too small to hold the head of the bone.

HIP-JOINT INFLAMMATION.—This disease is most frequently caused by tuberculosis, although it may be due also to other causes, such as infectious diseases (scarlatina, typhoid fever, gonorrhea), or purulent inflammation of the marrow in the thigh-bone (*osteomalacia*). The affection is observed more often in children than in adults, and is popularly known as “voluntary limping.” The first symptoms of the disease are disturbances of the motility of the joint, and pain in the knee. It is often the case that children with beginning inflammation of the hip-joint complain only of the pain in the knee, so that parents believe an inflammation of the knee-joint is present. Sometimes there may be only a slight stiffness at the hip-joint. If the disease progresses, the joint often becomes entirely immovable, and the affected leg appears at first too long, then too short. This alternating elongation and shortening of the leg is, however, apparent only. A true shortening of the leg can not occur until a later stage of the disease is reached, when the head and neck of the femur become destroyed. Often so-called cold abscesses develop. These may be located either on the front part of the leg, or behind the hip-joint; sometimes they may occur also in the pelvis.

Hip-joint inflammation is a very protracted disease, which in some instances may cause death by the extension of the inflammation, or by the spreading of the tuberculous process to internal organs. Even in cases of recovery there usually remains defective motility of the hip-joint or even lasting stiffness and limping.

The more careful the treatment the better the final result. Treatment consists in straightening the limb with an extension-apparatus, or with plaster of Paris bandages. Abscesses must be opened. Severe destruction of the joint necessitates the removal of the diseased bones and the joint-capsule. A careful diet is of immense service in this disease. Open air living is equally essential.

HIVES.—A disease of the skin, characterized by the eruption of flat blotches, red or porcelain-white in color, and varying in size from that of a bean to that of a dollar. The eruptions are variously termed nettle-rash, hives, or itching boils. They appear suddenly, burn and itch severely, and after a little while they disappear completely without leaving any scars. In appearance they resemble the swellings caused by the bite of a bedbug or by the sting of an ordinary nettle. Occasionally a single blotch may attain an extraordinary size, covering a cheek and both lids of an eye. The rash

often appears on a portion of the skin where the clothing is apt to press somewhat.

This common and very insignificant sickness, which is accompanied by pain and soreness in the limbs, lasts as a rule only a few days. In the case of many people it is a regular occurrence after eating strawberries, crabs, sea-food, etc., or after taking certain medicines, such as turpentine, or copaiba. In other cases it appears without any apparent cause; and by continued relapses it may last for months, even for years, and work very serious harm. In such cases it is often due to some internal disease, as, for instance, of the stomach or of the intestines; sometimes mental emotions may be the cause.

In most cases the itching is the only thing which calls for relief. This may be afforded by sponging the parts with cold water, diluted alcohol, vinegar, or with spirits of peppermint; by rubbing the itching spots gently with a slice of lemon or with a menthol pencil; or by a plentiful application of rice-powder. Naturally, anything known to be harmful (such as the foods just mentioned) should be avoided; and the patient should beware especially of vermin.

HOARSENESS.—A speech-disturbance occurring as a symptom of various affections. There are different degrees of hoarseness, varying from a slight dimming of the voice (recognizable only to the experienced ear) to a rough and harsh, or even to a jarring, grating, almost soundless voice. The most frequent cause of hoarseness is catarrhal inflammation of the LARYNX (which see). Constant hoarseness is caused by paralysis of the VOCAL CORDS (which see), by polypi of the larynx, by tuberculous and syphilitic ulcers, or by cancer of the larynx, etc. If the care of the voice is neglected in cases of beginning hoarseness (the patient continuing to sing, shout, or speak) the result may be that growths arise on the vocal cords and on the posterior wall of the larynx. These can be removed only by operative interference. Very strong exertions may even cause hemorrhages in the vocal cords, and slight spitting of blood. Staying in dusty, hot, or drafty rooms usually aggravates an existing hoarseness, or causes a recurrence of a former attack.

A state of hoarseness not due to disease occurs during the period when a change of voice takes place in children. In boys this change lowers the voice by one octave; in girls, by three to four notes. If the change of voice persists abnormally long (sometimes until the twentieth year), it may often be remedied by expert technical speech-exercises. The chronic hoarseness of preachers, teachers, singers, actors, etc., requires skilful medical attention.

HOFFMANN'S ANODYNE (SPIRITUS ÆTHERIS COMPOSITUS).—Compound spirit of ether; prepared by mixing 325 parts of ether with 650 parts of alcohol and 25 of ethereal oil. It is a colorless, volatile liquid, with a burning, somewhat sweetish taste, and with the peculiar odor of ethereal

oil. It is used as a stimulant, as an antispasmodic, and as a pain-allayer. In nervous insomnia it has proved of value. The dose is from thirty drops to a teaspoonful, given on a lump of sugar or in some sweetened water.

HOMEOPATHY.—A system of medicine founded by a German physician, Samuel Hahnemann (1755-1843). Medical literature contains many narrations of the untoward effects, some of them of the most serious character, caused by overdoses of drugs; and not a few instances have been recorded where moderate doses have been followed by marked symptoms of drug-poisoning in persons said to present an idiosyncrasy for the particular drug. Cases of poisoning in the industrial arts—lead-poisoning in type-setters, blindness following the use of methyl alcohol, etc.—are certainly not infrequent. Indeed, many medicinal substances are capable of causing disease in healthy persons, when administered in sufficiently large doses. And each medicinal substance produces a drug-intoxication peculiar to itself. The effects of poisoning by arsenic, by belladonna, and by opium can be easily differentiated by the symptoms to which each of these drugs gives rise in the subject of the poisoning. Thus, just as symptoms are the natural language of disease, so symptoms are the natural language also of drug action. The power of a drug to produce departures from normal sensation and normal function, to affect the human economy, can best be learned, and can only be learned in its entirety, by studying the symptoms it produces when given to persons in health.

The power of a drug can not be determined as well from the results of its administration in disease. Symptoms following its administration may be natural modifications arising in the course of the disease; or they may be only modifications of the disease-symptoms, and not symptoms produced by, and wholly attributable to, the drug. By symptoms is here understood, not only the sensations described by the patient, but also all those departures from the normal which are ascertainable by the most advanced methods of diagnosis. Experiments made upon animals can never entirely take the place of tests on healthy persons.

To Samuel Hahnemann belongs the credit of being the first to systematically study the powers of medicines in this manner. This he did by taking many drugs himself when in health, also giving them to members of his family and to his friends, including a number of physicians. The effects produced by the drugs on these healthy persons he very carefully recorded and systematically arranged. The whole series of effects produced by a drug on a healthy individual, he called a "proving" of that drug. Out of these provings Hahnemann constructed his *Materia Medica*, so grouping the symptoms produced by each drug in the one or more healthy individuals who "proved" it, as to present a picture of its disease-producing power. Thus, a text-book of homeopathic *materia medica* does not say that a given drug is to be prescribed in this or that disease; it is simply a col-

lection of symptoms produced by the drug when administered in varying doses to healthy persons of both sexes, of all ages, and of varying temperaments and susceptibilities.

In 1796 Hahnemann published in *Hufeland's Journal* his essay on a "New Principle for Discovering the Curative Power of Drugs." In the course of this article he said: "Every powerful medicinal substance produces in the human body a peculiar kind of disease—the more powerful the medicine, the more peculiar, marked, and violent the disease. We should imitate nature, which sometimes cures a chronic disease by superadding another, and employ in the disease we wish to cure that medicine which is able to produce another very similar artificial disease, and the former will be cured—*similia similibus*." The rule he here laid down is tersely expressed in the well-known motto: *Similia similibus curantur*, "Like [ailments] are cured by like."

About 1788 Hahnemann gave up the practise of medicine in disgust at the uncertainties of his art, owing to the lack of any principle for the administration of drugs in disease. For a time he supported his family by translating English, French and Italian works on chemistry, agriculture, and medicine into German. In 1790, while he was translating Cullen's *Materia Medica*, his mind being constantly on the alert for some guiding principle for the selection of medicines in disease, he found himself unable to accept Cullen's explanation of the action of cinchona-bark in the cure of malaria. He determined to test the action of the drug on himself. He says:

"I took, by way of experiment, twice a day, four drams of good cinchona. My feet, finger-ends, etc., at first became cold; I grew languid and drowsy; then my heart began to palpitate and my pulse grew hard and small; intolerable anxiety, trembling (but without cold rigor), and prostration throughout all my limbs set in; then pulsation in my head, redness of the cheeks, thirst, and, in short, all those symptoms which are ordinarily characteristic of intermittent fever, made their appearance, one after another; yet without the peculiar, chilly, shivering rigor. Briefly, even those symptoms which are of regular occurrence and especially characteristic—as the stupidity of mind, the kind of rigidity in all the limbs, but, above all, the numb, disagreeable sensation which seems to have its seat in the periosteum of every bone in the body—all these made their appearance. This paroxysm lasted two or three hours each time, and recurred if I repeated the dose; not otherwise. I discontinued, and was in good health."

The apparent similarity between the symptoms which the drug produced and those which it so often removed, set him to thinking, and he went to work to test other drugs on himself and on the members of his family. The result of these experiments was the formulation of his principle for ascertaining the curative power of drugs. In 1807 Hahnemann

first used the word "homeopathic." It appears in the title of an essay, likewise contributed to *Hufeland's Journal*, on "Indications for the Homœopathic Employment of Medicines in Ordinary Practice."

Homeopathy is the art of selecting and administering medicines in accordance with the law or rule of similars. A remedy is homeopathic to a given diseased condition when it has produced in the healthy individual symptoms similar to those which characterize the condition. According to the definition authorized by the American Institute of Homeopathy, "a homeopathic physician is one who adds to his knowledge of medicine a special knowledge of homeopathic therapeutics and observes the law of *similia*." A number of homeopathic societies require candidates for membership to acknowledge that the principle of *similia* is the best guide in therapeutics; but the freedom of a homeopathic physician to follow his best judgment in the treatment of patients is in no way hampered.

Homeopathy must not be confounded with Hahnemann's philosophy, his conception of a spirit-like force residing in drugs, or his psora theory. Homeopaths do not claim that the enunciation of the principle of *similia* was original with Hahnemann; he himself traced it to the times of Hippocrates. Similarly, Hahnemann's philosophy was a development of the philosophies of Paracelsus, Van Helmont, Descartes, and Stahl. The idea of testing the powers of drugs on the healthy was suggested by Haller. To Hahnemann belongs the glory of carrying out Haller's suggestion and of proving the universality of Hippocrates' observation.

In the minds of many homeopathy is synonymous with infinitesimal doses; and no article on homeopathy is consequently complete that does not discuss the question of dose. Susceptibility to the action of different drugs varies somewhat in different persons. One person can handle *Rhus toxicodendron* (poison-ivy) with impunity; another is affected by it if the wind blows from the plant toward him, even though he be on the other side of the road. Susceptibility also varies in the same person at different times, especially according to the state of health or disease of the person, just as the normal eye can bear the light that is intolerable to one that is inflamed. Hahnemann's experience was that in disease the human body is infinitely more susceptible to the action of a drug which is homeopathic to the morbid condition, than it is to the action of the same drug when in health; it is also, when diseased, infinitely more sensitive to the homeopathic drug than it is to one that is not homeopathic. Hahnemann claimed that he could not prescribe the physiological doses of drugs when he was administering them according to the rule of *similia*; and he also demonstrated that a drug which produced a certain morbid condition, or train of symptoms, when given in a large dose, would remove a condition presenting similar symptoms, when given in a dose exceedingly small.

The wonderful facts concerning the phenomena of radio-activity, now

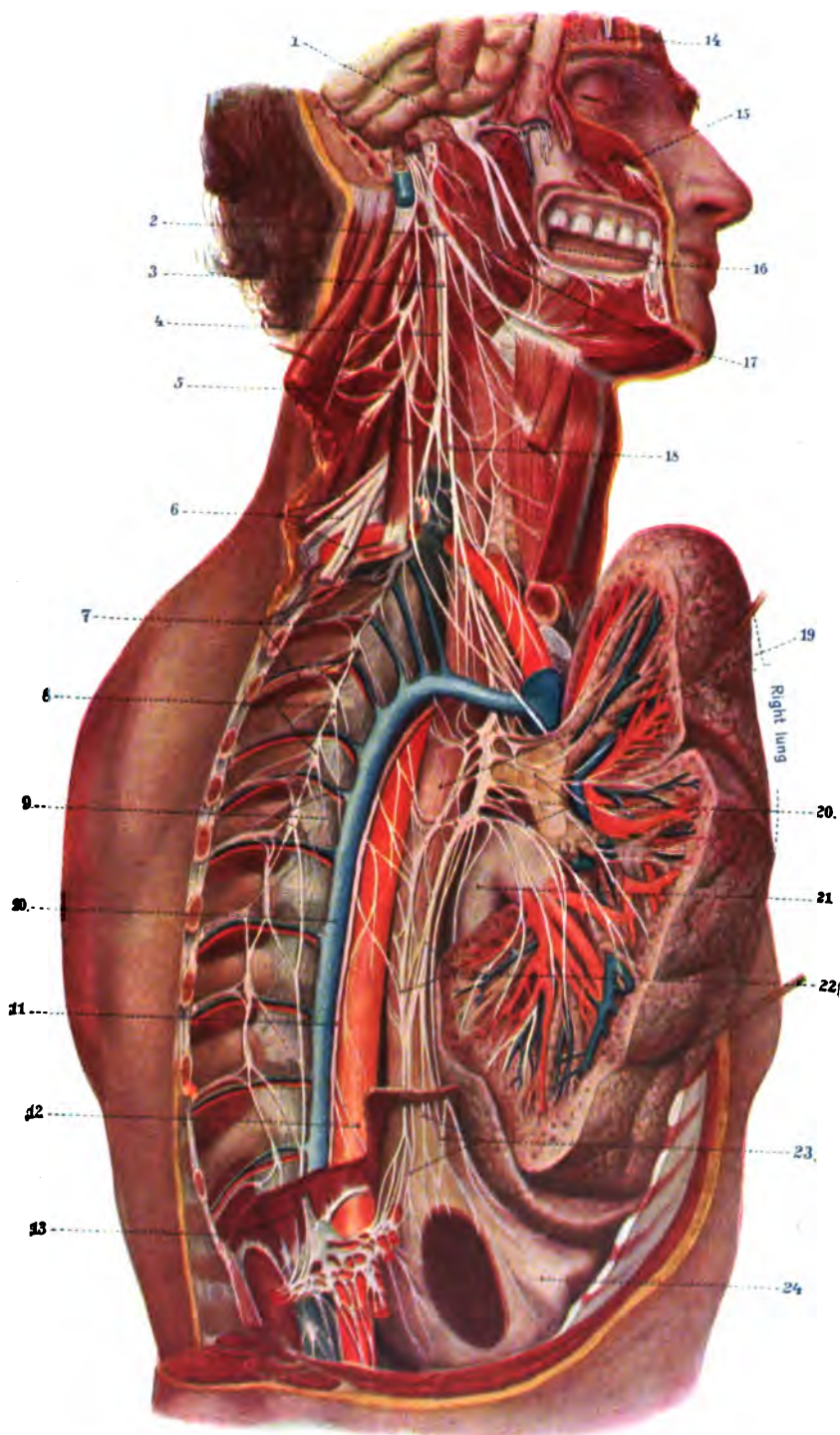
PLATE XI.—THE NERVES OF THE UPPER HALF OF THE BODY
(Right lung moved forward and showing section)

1. Thyroidal nerve
 2. Hypoglossal nerve (motor nerve of the tongue)
 3. Pneumogastric (vagus) nerve
 4. Cervical sympathetic nerve
 5. Cervical nerve plexus
 6. Brachial nerve plexus
 7. Intercostal nerves
 8. Intercostal sympathetic nerves
 9. Branches of sympathetic nerve to blood vessels
 10. Communicating branch between superior and inferior vena-cave
 11. Thoracic duct
 12. Aorta
 13. Diaphragm (cut)
 14. Subphrenic nerve
 15. Inferior vena-cave
 16. Sensory nerve of tongue
 17. Gustatory nerve (nerve of taste)
 18. Pneumogastric (vagus) nerve
 19. Esophagus (cut)
 20. Pulmonary branches of pneumogastric nerve
 21. Pericardium (cut)
 22. Esophageal branches of pneumogastric nerve
 23. Gastric branches of pneumogastric nerve
 24. Stomach
- (For functions of various nerves, see pp. 55-56.)

PLATE XI.—THE NERVES OF THE UPPER HALF OF THE BODY
(Right lung moved forward and showing section)

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| 1. Trigeminal nerve | 12. Aorta |
| 2. Hypoglossal nerve (motor nerve of the tongue) | 13. Diaphragm (cut) |
| 3. Pneumogastric (vagus) nerve | 14. Supraorbital nerve |
| 4. Cervical sympathetic nerve | 15. Infraorbital nerve |
| 5. Cervical nerve plexus | 16. Sensory nerve of tongue |
| 6. Brachial nerve plexus | 17. Gustatory nerve (nerve of taste) |
| 7. Intercostal nerves | 18. Pneumogastric (vagus) nerve |
| 8. Intercostal sympathetic nerves | 19. Esophagus (gullet) |
| 9. Branches of sympathetic nerve to blood-vessels | 20. Pulmonary branches of pneumogastric nerve |
| 10. Communicating branch between superior and inferior venæ cavæ | 21. Pericardium (heart-bag) |
| 11. Thoracic duct | 22. Esophageal branches of pneumogastric nerve |
| | 23. Gastric branches of pneumogastric nerve |
| | 24. Stomach |

(For functions of various nerves, see pp. 65-68)



demonstrated day by day by leading scientists, make it easier to conceive the power of infinitesimals. Nägeli has demonstrated that if metallic copper be thrown into water, the water will actually, in the course of time, become a solution of copper of the strength of one part copper to 77,000,000 parts of water. It is a matter of daily experience, demonstrable by any one who will make the test, that the protoplasm of morbid cells in a human body is affected by matter too attenuated to be detected by the balance, by the chemical test, or even by the spectroscope.

One and the same drug may be homeopathic to a great variety of diseased conditions. Bryonia produces in the healthy individual symptoms resembling those sometimes seen in synovitis, constipation, and gastritis. It will be homeopathic to any of these diseased conditions if the leading symptoms of the case correspond to the characteristic symptoms produced by the drug. All symptoms observed in provings are not of equal value in making a prescription. When any peculiar effects are seen in a proving, these are key-notes when the same symptoms are met with in a case of disease. Thus the homeopathic physician finds that he has need of a repertory, or index of symptoms, as well as of his materia medica. In the repertory the names of all the drugs that have produced a given symptom are grouped alphabetically under that symptom. Sometimes different forms of type are used for the names of the drugs in order to indicate that the symptom is more characteristic of one drug than it is of another.

In determining a prescription the homeopathic physician looks for three similarities: (1) between the sensations produced by the drug on the healthy and those complained of by the patient; (2) between the locations of these sensations; and (3) between the modifiers of these sensations. Thus, the pain of a headache may be described by one person as resembling that which would be caused by driving a nail through the head, by another as a constant throbbing. In the first case, the pain may be located in the side of the head; in the second, in the forehead. The pains of the first may be aggravated by the fumes of tobacco smoke, and relieved by lying on the painful side; the second may be aggravated by a bright light or by any sudden noise or jar. The first patient may be worse in the morning; the second, in the afternoon. What are called concomitants are also of importance. The first patient may be a nervous, hysterical woman; the second a plethoric person who is jovial and happy when well, but violent when sick. The former needs one remedy; the latter should receive another. One must not expect to find in a patient for whom a given drug would be the appropriate remedy, all the symptoms produced by that drug on healthy persons; it is enough if the symptoms presented by the patient are found among those produced by the drug.

Homeopathy as a system of therapeutics is unmodified by the changing views of pathologists. The drugs that Hahnemann and his friends "proved"

should be as useful to-day in diseased conditions presenting symptoms similar to those in the provings, as they were when prescribed by Hahnemann a century ago. This applies just as much to diseases attributed by modern pathology to microscopic germs, as it does to such simple disturbances as a cold or a headache. The actual effect of homeopathic remedies on these micro-organisms has not been determined; it is the belief of many homeopathic physicians that their remedies make their patients unfertile hosts for the germs. Not every person exposed to an infectious disease contracts it; germs have been found in perfectly healthy persons. The homeopathic practitioners claim that their remedies convert the suitable soil in which the germs are flourishing, into one in which the organisms can no longer thrive. This, however, is supposition only.

In making tests of homeopathy only those preparations of the drug should be used that were administered to the provers; and they should be procured from first-class homeopathic pharmacies. Aconite is prepared differently under the rules of the United States Pharmacopœia from what it is for homeopathic use. In homeopathic pharmacy the fresh green plants are used for making tinctures wherever possible. The Homeopathic Pharmacopœia of the United States requires that an estimate be made of the amount of moisture contained in a plant, and that in making a tincture nine parts of alcohol be added to one portion by weight of the dry portion of the plant. Special rules are laid down for dealing with insoluble substances. The "potencies," "dilutions," or "attenuations," are made from the tincture of the crude drug according to both the decimal and the centesimal scale. Aconite 3x means one part of aconite to 999 parts of the vehicle; and aconite 2c means one part of aconite to 9,999 parts of the vehicle. Certain rules are laid down for the making of these "potencies."

Experience has demonstrated that some substances which in their crude state are perfectly inert, have a remarkable power to both produce symptoms in the healthy and cure similar symptoms in the diseased when they are "potentized" according to the rules of the homeopathic pharmacopœia. Dr. Roux of anti-diphtheritic serum fame, is said to have declared that the treatment of diseases by "vaccines" and "serums" was a form of homeopathy. Certain nosodes, or disease-products, have been "proved," and are being used by many homeopathic physicians. Perhaps the most popular of these is tuberculin. This, however, is not to be prescribed for every case of tuberculosis, but only for those showing symptoms similar to those found in the provings of tuberculin. And, again, tuberculin is successfully prescribed in many cases which exhibit no evidence of tuberculosis, but in which the symptoms of the patient correspond with those produced by the drug.

HONEY (MEL).—A sweet substance excreted by the bee (*Apis mellifica*), and deposited in the honey-comb. When fresh it is fluid, but on standing

it gradually crystallizes. It is white, yellowish, or brownish-yellow in color, and readily soluble in cold water. Honey has the same properties as sugar, but is more apt to affect the bowels. In medicine its chief use is as an addition to bitter gargles.

HONEY AND BORAX.—A mixture of powdered borax (60 parts), glycerin (30 parts), and honey (480 parts). It is used in the thrush of infants, and in eruptive ulcers of the mouth, being painted on the sore parts with a tuft of cotton wrapped around a finger.

HOPS.—See **HUMULUS**.

HOT-AIR BATH.—A bath in which the body, or part of the body, is exposed to the action of hot air for the purpose of inducing perspiration. In the so-called "Turkish bath" several connecting rooms are heated at varying temperatures, from 104° F. to 140° F., the bather remaining for some time in each room so that his body is gradually brought into profuse perspiration. The bather is then given a cold shower-bath and massage, whereupon he rests upon a couch, wrapped in blankets. This form of bath is very exhausting and should be indulged in only by strong individuals. The fact that the head of the bather is also exposed to the hot air is an objectionable feature, which may cause disagreeable consequences. Persons suffering from disorders of the lungs, of the heart, or of the brain, spinal cord, or nerves, can not be cautioned too earnestly against taking these baths. Hot-air baths, however, are to be preferred to **STEAM-BATHS** (which see), because in the former the body is actually made to perspire, whereas in the latter the steam is merely precipitated upon the skin of the bather. In the following shall be mentioned some forms of hot-air bath apparatus.

In the box-bath a box similar to that shown under **STEAM-BATH** is used, the air being heated by means of a closed steam-radiator from which the steam can not escape. The head of the bather is outside the box. The air may be heated from 120° to 140° F., but patients should be cautioned against too high temperatures. In most cases a temperature of 120° to 130° F. will be sufficient to induce perspiration, if the precaution be taken to heat the box before the patient enters it. Attendants are often in the habit of heating the air in the box to a temperature of 140° F., or over, contrary to the fact that they know better. It is true that the human body will submit to many things, and that the skin affords good protection, but a temperature of 130° F. is sufficient to change vital organs; and hot-air baths are, therefore, not devoid of danger. The duration of the hot-air bath should be from ten minutes to half an hour, and a cold compress to the head is useful while in the bath. The bath should be followed by a cold douche, or by a cold bath; or, if after-perspiration is required, the entire body should be wrapped in woollen blankets for from half an hour to one hour, and massaged.

Local hot-air baths may be administered to the different parts of the body, such as the chest, the abdomen, the shoulders, the hips, or the limbs. For this purpose special apparatus have been constructed, which consist of boxes made of wood or of water-proof canvas, the openings of which fit the body snugly. The air in such an apparatus is heated by a gas or alcohol lamp with a tin chimney, the upper end of which runs into the appa-



FIG. 230. Hot-air bath for the shoulder.

ratus (see Fig. 230). Local hot-air baths are used especially in joint-affections, gout, arthritis deformans, and rheumatism, and also in painful nervous affections. After the bath lukewarm sponging, cold douches, and massage are to be recommended.

Special apparatus are made in which the air, by means of electrical appliances, may be heated to a very high temperature (200° F., or over). These apparatus, called electrotherms, are more or less successfully employed in obstinate affections of the joints. They require the use of special contrivances to protect the skin from burns.

HOUSEHOLD REMEDIES.—See DOMESTIC REMEDIES.

HOUSEMAID'S KNEE.—Name given to a condition characterized by a chronic swelling in front of the knee-joint. It is due to an inflammation of the membrane lining the synovial cavity of that joint (see p. 38), and a consequent accumulation of fluid. The affection has derived its name from the circumstance that it chiefly arises from working in a kneeling posture. Rest and cold applications may reduce the swelling, which is often accompanied with much pain; but in stubborn cases operative treatment may be

necessary. Similar swellings occurring generally on the wrist, are called *ganglia*. See *GANGLION*.

HUMULUS (HOPS).—The carefully dried strobiles of *Humulus Lupulus*, or hop-vine, a very widely distributed, climbing herb. Its most important constituent is a yellowish, glandular powder termed *lupulin*, which contains volatile oils, terpenes, and a number of unknown constituents. The action of hops is diuretic and slightly sedative; and it is used internally as an antispasmodic. It has very little of its reputed value to cause sleep.

HUNCHBACK.—The development of a deformity in the back (Fig. 231) affords indisputable evidence of the existence of an inflammation in the vertebral column, a destructive process in one or more vertebræ. In the majority of cases the condition is due to a tuberculous disease of the backbone, a chronic process which it may take years to cure. In the course of the disease other serious symptoms may appear, including paralysis of the legs, of the bladder, and of the intestine. Suppuration may also set in, resulting in the formation of cold abscesses which may burrow their way into the pelvis or into the thigh. The treatment of this disease requires great care. Efforts to prevent further deformity demand rest on a hard, flat mattress; suspension in a special form of sling; the application of various apparatus or plaster corsets, etc. The cold abscesses usually disappear by a process of gradual absorption; but if this does not take place they may be evacuated by incision or by aid of an aspirator, followed by the injection of various medicinal substances.



FIG. 231. Hunchback.

HYDRARGYRUM.—See *MERCURY*.

HYDRASTIS.—The dried rhizome of *Hydrastis Canadensis*, a low herb growing in open woodlands in the eastern United States. It is known also as goldenseal, orange-root, and turmeric-root. Its active principle is the alkaloid *hydrastin*, and the root also contains a small percentage of oil, berberin, and other inert substances. Hydrastin acts chiefly on the unstripped muscle-tissue in the body, and is therefore utilized to constrict the

blood-vessels, to raise blood pressure, and also to affect the uterus. Furthermore, it is of value in the treatment of relaxed conditions of the hollow organs, particularly in some forms of diarrhea and in bladder disturbances. It is chiefly used in the form of the fluid extract, in doses of from ten drops to half a teaspoonful.

HYDROCELE.—An accumulation of water between the testis and the surrounding layers. This condition may cause serious swellings, and is very trying to the patient. The disease may be either congenital or acquired. When acquired it frequently results from external injuries to the testicle, as from a knock or a blow. Congenital hydrocele in young children is easily removed by making an incision and draining off the water. In some cases this treatment must be repeated several times before a cure is effected. In adults an incision is not always sufficient in the treatment of hydrocele, as the water continues to gather. In such cases splitting of the tunics will prove effectual. This operation is absolutely without danger.

HYDROCEPHALUS.—Dropsy of the brain; a condition characterized by a morbid accumulation of fluid between the membranes or within the ventricles of the brain. This disease is either congenital, or it arises during the first years of life. The constantly growing pressure exerted by the water upon the brain and skull results in a wasting of the substance of the brain and in enlargement of the circumference of the skull. Children thus affected remain bodily and mentally undeveloped. They scarcely learn how to talk; they are affected by spasms and muscular twitchings; and most of them die during the first months or years of life. Attempts have been made to remove the fluid operatively, by puncture of the skull; but at best this operation has been attended with only temporary success.

Dropsy of the brain must not be confused with that form of enlargement of the skull which occurs in rickets. The deformed, shaking head, with the small trunk, crippled limbs, and idiotic facial expression, so characteristic of patients suffering from dropsy of the brain, is absent in rickets. An illustration will be found under **IMBECILITY** (Fig. 235). Acute dropsy of the brain is another name for acute cerebrospinal meningitis.

HYDROCHLORIC ACID.—A colorless, transparent, corrosive acid, commercially prepared by the action of sulfuric acid on common salt. When swallowed it causes abdominal spasms and excruciating pain in the stomach. The patient suffers great thirst, his skin is dry and burning, and the pulse small. The treatment consists in administering magnesia, soap, or some diluted alkaline solution. Mucilaginous drinks should be given freely.

The diluted hydrochloric acid contains 100 parts of the stronger acid in 219 of water. It is given in doses of from 15 to 30 drops in water, and is useful as a tonic in some febrile diseases, and as a digestant in gastrointestinal disturbances. The strong acid is often used to remove warts and corns, but is less effective than **NITRIC ACID** (which see).

HYDROPERICARDIUM.—See PERICARDITIS AND HYDROPERICARDIUM.

HYDROPHOBIA.—See RABIES.

HYDROTHERAPEUTICS.—See WATER TREATMENT.

HYMEN.—A thin membrane which closes the vaginal entrance, with the exception of an opening in the center large enough to allow the passage of a finger. It tears with bleeding during the first sexual intercourse, and is destroyed by the first childbed, nothing remaining but small, wart-like projections. It is of no great value as a sign of virginity, as it may have been torn accidentally during childhood; and, on the other hand, if the membrane is very extensible, it may be preserved until the first childbed, in which case it may occasionally become an obstruction to birth.

The congenital closure of the hymen may be fraught with great danger if medical assistance be not called in time. In such cases the menstrual blood is dammed up at the time of puberty, causing severe abdominal pains, and dilating the vagina, the womb, and the tubes into large blood-tumors which finally tear and lead to death by peritonitis. In young girls who suffer every four weeks from continually increasing abdominal pains, but who do not menstruate, a medical examination is necessary.

HYOSCYAMUS.—The dried leaves and flowering tops of *Hyoscyamus niger*, or henbane, a plant indigenous to central and southern Europe, and Asia, and sparingly cultivated in the United States. The leaves and seeds contain a number of closely related alkaloids, the most important of which are thought to be *hyoscyamin*, and *hyoscin* or *scopolamin*. The physiological action of hyoscyamus very closely resembles that of belladonna. It causes the mouth to become dry, and brings about a condition of more or less active excitement, leading to delirium, or in larger doses to coma and sleep. It diminishes the secretions; and like belladonna it increases the activity of the respiratory center, or in larger doses paralyzes it. The action of hyoscyamin differs somewhat from that of hyoscin in that the former causes more excitement, hyoscin often being used to produce sleep. Hyoscyamus is a very active remedy, and should be prescribed only with great caution.

HYPNOTISM.—A somnambulistic state in which the mind becomes abnormally impressible to suggestions. It is a well-known fact that the majority of human beings are influenced in their actions and opinions by other people. They acknowledge that reasons given by others are valid, embrace their views, and accept and follow advice given them. Similar occurrences are observed in medicine. A sick individual may be influenced favorably or unfavorably in regard to his affection. Even the physician's simple assurance, uttered convincingly, that the affection is not dangerous, that it is sure to be cured before long, and that the fears of the patient are unfounded, raise the courage and the hopefulness of the patient. Owing to the intimate connection between mind and body such encouragement

also stimulates the activity of the latter, so that morbid disturbances are more readily overcome. This influence of the physician has always been known, and has ever been utilized, consciously or unconsciously. Intentional "influence" has been developed lately as a special method, and the extent of its application limited.

"Intimations" given to the patient for the purpose of ameliorating or curing his disease are often called "suggestions," and the method of treatment founded upon this principle is called "suggestive treatment." It is not always possible, however, to give a patient a curative suggestion while he is awake, or to render it effective; because while awake he may be too much under the influence of contrary ideas, contrary reasons, or auto-suggestions. To attain the desired end in such cases, the patient is therefore "made sleepy." He is put into a condition resembling sleep, called *hypnosis* (from the Greek *hypnos*, "sleep"). During "artificial sleep" man is more susceptible to suggestions.

It is possible to hypnotize the majority of people. Some even maintain that all mentally sound persons are hypnotizable. It is obvious that some persons are more readily suggestible than others. The sleep, also, is more or less profound. Some persons become sleepy only to a slight degree, and are still able to offer resistance to the suggestions given; for instance, to open the eyelids although the hypnotizer orders them to do the contrary. Others fall into a light sleep and are unable, in accordance with the desire of the hypnotizer, to open the eyelids; they follow the "suggestions" entirely or in part. Still others fall into a profound sleep (somnambulism) which is distinguished by absolute submission to the commands of the hypnotizer, and by loss of memory; that is, upon awakening, the patients do not know what happened to them during the hypnotic state. To accomplish a good result profound sleep is by no means always necessary; slighter degrees are very often fully sufficient.

The production of the hypnotic state is accomplished in various ways. The best known method is that in which the subject is made to gaze upon an object, or to listen to monotonous sounds, such as the ticking of a watch. Another method consists in stroking the patient with the hands, either by touching a part of his body (for instance, the forehead) or by passing over it at some distance ("magnetic strokes"). In the latter method, however, which is employed by so-called magnetizers, no "magnetic power" is passed from the operator to the subject, as has often been assumed. Essentially the so-called magnetizing is nothing but hypnotizing. Physicians usually suggest the occurrence and the depth of sleep by words. It may be mentioned, finally, that some persons are able to put themselves into a hypnotic state. This state, which is called auto-hypnosis, is undoubtedly the trance condition of spiritualistic mediums.

Certain remarkable manifestations may be produced in hypnotized

persons. It is possible, for instance, to make certain parts of the skin, or even entire limbs, either insensitive or hypersensitive; to suggest loss of speech, sight, hearing, etc.; to make them drink water for wine; to put the body into a condition of general rigidity so that it becomes absolutely stiff; and to place the limbs in any desired position, even an uncomfortable one, and make them remain thus for some time (for instance, vertical raising of the arm, see Fig. 232). During the somnambulistic state of the patient, it is even possible to give orders which he is to execute some time after awakening (post-hypnotic suggestions).

In the small space which is here afforded a complete exposition of this field can not be made. It only remains, therefore, to state briefly in which cases hypnotism is suitable for curative purposes. Nervous affections of the most varied descriptions have been shown to be susceptible to hypnotic treatment; as, for instance, hysteria, involuntary thoughts, conditions of fear, headache and migraine, disturbances of sleep, and nerve pains. Sexual perversions and bad habits may also be beneficially influenced. Many troublesome symptoms of affections which are not of a nervous nature may at least be ameliorated to some extent. It is obvious that diseases which are otherwise

incurable can not be influenced, for hypnotism is no miraculous remedy.

Occasionally it happens that the hypnotic state is followed by conditions of indisposition; such as giddiness, headache, fatigue, trembling, or even by severe hysterical manifestations. It is to be borne in mind that no one can be hypnotized against his will. Resistance effectually prevents the phenomenon. Hypnotism is a condition depending upon voluntary submission to the will of another person; it is not a question of one's being compelled by another's will.

HYPOCHONDRIA.—A condition of mental depression, in which the affected individual usually believes himself to be suffering from some severe disease, such as syphilis. While not actually amounting to insanity, it frequently develops into a condition which borders on the morbid. Moreover,



FIG. 232. Rigidity of limbs brought about by hypnotism.

hypochondria may exist as a part symptom of some general mental disease, such as manic-depressive insanity. See INSANITY.

HYSTERIA.—A nervous affection characterized by functional disturbances. Hysteria was known to the physicians of ancient Greece, and many of the prophesying priestesses, who uttered their oracular sentences during paroxysms of emotion, were merely hysterical women. Hysteria was formerly believed to be due to some affection of the womb; hence its name, which is derived from the Greek *hystera* ("womb"). The malady was therefore considered to be a disease affecting only the female sex, especially old maids. This erroneous opinion prevailed until the middle of the nineteenth century when it was definitely refuted, owing especially to the investigations conducted by the Paris school under the celebrated nerve-specialist Charcot. It is now known that hysteria has nothing to do with the womb, and that it occurs in males as well as in females, and in adults as well as in children. It is an affection of the brain, and is due to purely mental causes.

During the middle ages, and even in more modern times, hysteria has been associated with superstitious beliefs in bewitchment and enchantment, and in being possessed by evil spirits. Hysteria found a fertile soil during a period characterized by religious fanaticism, ignorance, and superstition. Pictures from that period have been preserved, depicting cures of such "possessed" persons. These pictures show the exact symptoms which to-day can be seen in hysterical patients in every clinic for nervous diseases. Fortunately, a change has taken place in the treatment. Torture and pyre, exorcism and conjuration, are no longer employed; but physicians treat and cure the malady by the application of water and massage, by regulating the diet, and by suggestion, etc. What formerly were described and wondered at as miraculous cures of possessed persons (having often been the cause of canonizations) are now revealed to science as the cure of hysteria by hypnotic suggestion. Such cures are now effected by nerve-specialists; and the methods employed are taught in the clinics. The belief in evil spirits that dwelt in human beings and rendered them "possessed," has died out; and modern enlightenment has made it clear that these people were merely diseased persons suffering from hysteria.

The main underlying cause of hysteria is heredity, to which are added the exciting causes that bring on the manifestations of the disease. The affection may occur at all ages, most frequently between the tenth and the thirtieth years of life; not quite as often in men as in women. Some authors, however, report that, according to their statistics, the number of hysterical men is even larger than that of hysterical women.

Among the occasional causes of hysteria mental excitement is the most conspicuous. A single emotion or shock may be sufficient to cause an attack of hysteria in persons who are hereditarily predisposed, and who are weak-

ened by a faulty education, by religious expiations with fasting and castigation, by mental overwork, or by accident or injury. As a result of mental imitation epidemics of hysterical convulsions may be called forth in schools, convents, etc. In ancient times such epidemics were by no means infrequent. The mental shock which accompanies an injury, or which occurs by witnessing an accident, may occasionally lead to an outbreak of hysteria. Such a shock may cause sudden paralysis, or the individual may lose the faculty of speech. Mental and physical overexertions, sexual perversions, and excessive onanism may likewise give rise to hysteria.

The different manifestations of hysteria, called *stigmata* ("signs"), depend upon the condition of each given case. The signs are physical as well as mental ones. The most important physical sign consists in a loss of sensitivity, or in a hypersensitivity, of the skin of the entire body, or of some parts thereof. This sign had been observed in the middle ages, at which time it was taken to be the mark of the devil; and the alleged witches and sorcerers were examined with regard to this phenomenon. If parts of the skin were found to be insensitive to the prick of a pin, the Church declared the unfortunates to be convicted of witchcraft and sorcery, and the hysterics were surrendered to the secular authorities to be burned on the pyre. Partial insensitiveness of the skin is very frequent in the hysteric, and may affect small spots or large areas, the skin of one limb or that of the entire half of the body. Mucous membranes (for instance, that of the mouth) are sometimes without sensation. The smallest blood-vessels of the skin (the capillaries) may be influenced reflexly, as it were; that is, by unconscious processes. These blood-vessels may become either spasmodically narrowed to such an extent that pricks into the skin will not cause bleeding; or they may become so dilated in some places that blood escapes into the skin through their delicate walls. Disturbances of smell and taste may also occur. Especially remarkable are the disturbances of sight and hearing caused by hysteria. If increased sensitiveness to pain happen to occur in a joint, it may simulate a severe affection of the joint; and this condition becomes aggravated by rest and bandages, whereas it is much more apt to be cured if no notice be taken of it, and if the affected joint be used.

Other frequent manifestations (such as muscular spasms and curvatures of limbs) can be explained on the hypothesis of an excessive stimulation of certain nerve-fibers which are influenced in their activity by unconscious ideas. These phenomena happen in all muscles. If muscular spasms occur suddenly they give rise to distortions of the body. The patient tosses about wildly in morbid convulsions. Formerly this was explained as "the possessed one being thrown to and fro by the evil spirit." A frequent form of these harmless hysterical convulsions is the bridge position (see Fig. 233), in which the patient places his heels and the back of

his head firmly against the ground, while he stretches his body so that it forms an arch. The movements made during an attack of hysterical convulsions may be as varied and as clownish as those seen in a circus performer. Generally they create a deep impression upon a layman, but they are without significance. Convulsive laughter, weeping, and screaming also belong in this category as being of hysterical origin. In some cases there occurs only a trembling of the muscles instead of well-developed convulsions; in the higher grades it may pass over into rhythmical beating, knocking, or trampling. If no attention be paid to these convulsive seizures, they



FIG. 233. Bridge position in hysterical convulsion.

cease spontaneously as a rule; but if the onlookers appear to become alarmed, the hysterical phenomena are apt to become aggravated.

The muscles of the hysterics may be attacked by paralysis which may render one or more limbs useless. In such cases the patient may be obliged to use crutches or, if both legs be paralyzed, to remain in bed. In some instances the muscles of the larynx become paralyzed so that the patient is rendered unable to speak. The muscles of respiration and deglutition, however, are never involved. Hysterical paralysis may persist for years. As it is of purely mental origin, and not due to any demonstrable destructions of nerves, the patient may always recover; and the paralysis may even disappear all of a sudden. If a paralyzed, hysterical patient be firmly convinced in his own mind that a certain remedy will help him, he will be cured by the application of that remedy. This is the "healing by virtue of belief" or, as physicians call it, suggestive effect. The form of the remedy is quite immaterial. It may be a conjuration or a threat with a red-hot iron, a prayer or a cold douche, a pilgrimage to a sacred shrine or the application of an electric current, the consulting of a quack or the firm advice of a celebrated physician, the taking of an expensive medicine or of a silver-coated bread-pill.

Any form of emotion may likewise act as a remedy. During a battle the hysterically mute son of a Persian king saw a hostile warrior approach his father with uplifted weapon. When he was on the point of striking

the deadly blow the son suddenly exclaimed, "Man, thou art about to kill the king!" and thenceforth he was no longer mute. Every nerve-specialist and every laryngologist can relate examples of similar incidents that have occurred in the course of their own practise.

The course of hysteria is usually a favorable one, it being of importance only that the physician diagnoses the disease correctly. This disease affords a striking proof of the absurdity of the contention of quacks, that a diagnosis is not necessary at all. A hysterical patient may possibly remain paralyzed all his lifetime if incorrectly treated; whereas it is possible that a physician who recognizes the affection may cure the disease in a few minutes. In severer cases of hysteria it is advisable to isolate the patient in a suitable sanatorium for the treatment of nervous diseases. In such a place all modern remedies may be employed. But the principal point always remains the mental influence exerted by a physician familiar with the affection. Consult Dubois, *The Psychic Treatment of Nervous Disorders*, New York, 1905.

I

ICE.—This is largely used to allay thirst in patients suffering from fever, and also as a hemostatic in pulmonary and gastric hemorrhages. In the latter class of cases it is better to apply it externally, in an ice-bag, than to administer it internally. The use of ice for cooling purposes, administered in ice-bags, cloths (for the throat), or ice-caps (for the head) is well known. Such cooling applications are of service in all inflammatory diseases which are characterized by local congestion, pain, and heat; especially in meningitis, apoplexy, cerebral congestion, inflammations of the lungs, pleura, or pericardium, valvular diseases of the heart, gastric hemorrhage, peritonitis, and in a number of other conditions, including recent contusions and sprains. In filling an ice-bag the ice should be broken up into small lumps by the aid of a fork or a nail; the ice-bag should be filled about half, care being taken to exclude all air from the bag before closing it, so that it will lie perfectly flat on the body. In order to avoid injuring the skin, a dry flannel or linen rag should always be placed under an ice-bag. Renewal of the ice is necessary in from one to two hours.

In order to avoid undue pressure, the ice-bag may be suspended above the desired locality by means of a contrivance similar to that shown under PERITONITIS. It may be applied also over a cold compress; and in restless persons it must be held in place by a bandage. An "ice-pillow" may be prepared by mixing finely cracked ice with sawdust, or with ground flaxseed, and then enclosing the mass in a bag made from a piece of oiled silk. In this way the ice will last for a period of from three to four hours; and such

a pillow is very grateful for the patient to rest his head upon. Ice used for internal administration should be strictly pure.

ICHTHYOL.—A peculiar substance obtained in the form of a crude oil resulting from the destructive distillation of a shale-rock found for the most part in the Tyrolese mountains of Europe. The rock is made up largely of the fossils of fish; and in the distillation of the product the oil acquires a number of the decomposition products of these fish. Ichthyol is a very complex substance, and is of great use in the treatment of local affections, particularly erysipelas, wounds, and lupus, in a number of skin-diseases, and in some internal conditions. It is both antiseptic and stimulating. Its action is thought to be due in large measure to sulfur compounds. A number of artificial ichthyols have been manufactured, but are not by any means as effective as the natural product.

ICHTHYOSIS.—See FISH-SKIN DISEASE.

IDIOCY.—See IMBECILITY.

ILLUMINATION.—See LIGHT.

IMBECILITY.—A condition of severe mental defect. If of a grade severe enough to render the patient helpless, it is usually termed *idiocy*; if the patient is able to dress himself unaided, and to attend to the wants of nature, the affection is generally known as *imbecility*. The defect may be acquired or congenital. Acquired imbecility is usually a result of continuous mental disturbances in early childhood. The form of mental defect due to affections of the brain, and to old age, is more properly termed *dementia*. Both imbecility and idiocy imply a defective development rather than a loss of brain-power once developed. The majority of idiots are the children of nervously or mentally deranged parents, the descendants of drunkards being especially liable to the affection. As in this instance an originally defective development of the mind will not allow of full mental growth, so may early affections of the brain (inflammations, or injuries) also result in like consequences. The greatest number of cases of imbecility results from injuries to the brain at birth, forceps operations being responsible for many. Children suffering from rickets are often mentally backward.

A special form of idiocy is *cretinism* which is due to an affection of the thyroid gland (see THYROID GLAND, DISEASES OF). Cretins are lagging also in bodily development (see Fig. 234), and many of the dwarfs exhibited in circuses and museums owe their short statures to cretinism. The occurrence of this disease is fortunately restricted to certain regions; for instance, to certain valleys in the Alps, and to a few places in the Palatinate and in Franconia. The cause of the degeneration of the thyroid gland is not sufficiently understood as yet. Not only cretins, however, but many other idiots are affected by disturbances of growth. Especially frequent are abnormalities of the skull, such as extreme smallness (*microcephalia*) or

abnormal largeness (*macrocephalia*; see Figs. 235, 236). Often the growth of the various parts of the body does not progress uniformly. Various deformities are of frequent occurrence, such as crooked limbs, deformed feet, displaced teeth, harelip, cleft palate, and various other malformations. Other peculiarities often encountered in idiots are: epileptiform spasms, trembling, St. Vitus's dance, paralysis, stuttering, and deaf-mutism, as well as a great variety of automatic movements, such as shakings of the head, peculiar movements of the lips, and grinding of the teeth.

The mind may be stunted only, or there may be complete absence of mental independence. Every conceivable gradation may be encountered. In idiots of the lowest grade the entire mentality is a barren field; they have absolutely no will-power; their facial expression is dull and silly; and the faculty of speech is absent. An idiot ranging slightly higher may show more mental and bodily activity, but his power of imagination remains blunted and is restricted to the most simple conceptions. His speech is clumsy, and his volition scarcely passes beyond perceptive impulses. The wide-spread opinion regarding the strong development of sexual desire in idiots, is erroneous. Sexual outrages, which occur occasionally, may be explained simply by the lack of resistance with which an idiot will follow his impulse.

The milder grades of imbecility approach the normal condition of the

mind by gradual steps; and as a rule it is impossible to demarcate precisely the line dividing the normal from the abnormal state. Mental weakness is characterized, above all, by a superficiality of thinking, by the absence of the power of judgment, and by inability to deliberate carefully. Here, too, impulse is followed immediately by action, without the patient weighing the motives. Almost all imbeciles are extremely impulsive. Sometimes there is a strange inequality in the development of the mind; for instance, a phenomenal memory may exist together with an almost entirely undeveloped



FIG. 234. Cretin.

faculty of judgment. Many "lightning calculators" who appear in public, and are greatly admired, are unmistakably imbecile.

The moral dulness of imbecile individuals is a characteristic phenomenon which manifests itself more frequently in the milder than in the severer forms of imbecility, often making it very difficult to have anything to do with these patients. From their earliest childhood these imbeciles are a burden to their parents and a torment to their teachers. Addicted to lying, cruel to animals, deceitful, and impulsively passionate, they defy all educational efforts. They are incapable of attending to an occupation, owing to their lack of steadiness and perseverance, and to their mental superficiality,



FIG. 235. Macrocephalia.



FIG. 236. Microcephalia.

although they may learn to repeat some high-sounding phrases which may impress the uninitiated. They take up one trade after another, but fail in all. Owing to their unbounded egotism and to their lack of power to resist the temptations of life, they frequently collide with the laws. Neither the most careful education during childhood, nor any disciplinary punishment which may be administered later in life, is able to improve the abnormal character of these patients. Many of them end their days in the workhouse or in jail, unless they are placed in an insane asylum. It is often very difficult to pass an opinion as to the mental condition of such individuals, as it can not always be determined whether or not they have passed beyond the limit of what is morbid. Some alienists designate these imbeciles as "morally weak-minded," an expression which should be used only with the greatest caution, as it is apt to produce the entirely erroneous opinion that alienists look upon immorality as a morbid condition.

Idiocy is incurable, although not always impossible of improvement. If it is due to rickets, medical treatment will often accomplish good results. The same holds good for cretinism, a successful method of combating affections of the thyroid gland having been discovered recently. Even in cases in which the evil can not be attacked at the root, it is possible at least to make an attempt at mental development. Parents should not entrust their defective children to an insane asylum. They should by all means consult an experienced physician and teacher who has made a specialty of this work. Extensive efforts have been made to instruct mentally weak pupils in separate "auxiliary schools." Unfortunately, the problem of educating imbeciles, especially with regard to moral defects, is still unsolved. Neither insane asylums nor prisons nor workhouses are the right places for these unfortunates whom nature has neglected. They need special institutions, patterned somewhat after the Craig Colony for Epileptics in Sonyea, New York; the New Jersey State School for Feeble-Minded, etc.

IMMUNITY.—Resistance to the poisons of infectious diseases, or to the bacteria which produce these poisons. It is a fact within the observation of every one, that some persons are much more apt than others to contract infectious diseases; and this variation in susceptibility may be noticed also among the lower animals, and even among plants. For instance, certain plants are found growing in soils which contain enough metallic poisons to destroy animal life; and some poisons which prove fatal to human beings are comparatively harmless to certain lower animals, as in the case of strychnin, to which birds are almost immune. The diseases to which plants are subject are practically never found among animals; nor are those which attack animals found among plants. Diseases of the human race are rare among the lower animals; and the various species of these animals differ with regard to the nature of the diseases to which they are prone. Thus it is seen that human beings, the lower animals, and plants respectively possess relative immunities to certain disease-producing agencies.

These natural immunities may be lessened; as, for instance, when an attack of measles renders one more susceptible to the infection of tuberculosis. On the other hand, a partial immunity may be strengthened, or even a new immunity acquired. Thus a distinction is made between natural immunity and acquired immunity; but in the light of the doctrine of evolution, natural immunity may be considered as one acquired by heredity. Immunity in human beings includes both natural and acquired powers which the body possesses to destroy bacteria (*bacteriolytic power*), and to destroy poisons (*antitoxic power*). The struggle between these forces and the bacteria and toxins which they combat, is a most interesting field of investigation, and one which still offers mysteries to be solved.

The practical utilization of acquired immunity began with the introduction of vaccination, which was arrived at from observations of the immu-

nity which followed an attack of measles, scarlet fever, or smallpox. Other diseases, such as influenza and erysipelas, also confer an immunity, but a more transient one. An animal may acquire for itself an active immunity by direct adaptation; or it may have conferred upon it a passive immunity by a body made in the blood-serum of another animal. Just how this immunity is brought about is not positively known, and several theories attempting to account for it have already been exploded by investigation. According to Pasteur's "exhaustion theory," the bacteria died when the available food supply was exhausted; and the "retention theory" assumed that they died from their own products. Both these theories have been proved untenable. Other theories—the "mechanical," the "humoral," and the "phagocytal"—contain modicums of truth, but fail to cover the whole ground. At present, the theories which gain most credence are chemical, and the most conspicuous is Ehrlich's "side-chain theory." This is a very elaborate and technical theory; but the principle on which it is based, that the blood-serum of men and animals may be so modified that it can overcome the effects of bacteria and toxins, is one which has borne practical fruit in the production of the now indispensable diphtheria antitoxin. With this successful production of a passive immunity in man, it was hoped that a means had been found to overcome all the infectious diseases; but this hope was doomed to disappointment, as it was soon discovered that other diseases necessitated reckoning with more unmanageable factors than the simple toxins. The poisons as well as the bacteria must be destroyed; that is, antitoxic as well as bacteriolytic immunity must be secured. According to Ehrlich's theory, the cell-body possesses a number of side-chains or receptors which can combine with food-products for the metabolism of the cell. Some of these can combine with toxic products as well, with damage to the cell. Ehrlich believes that antitoxins consist of surplus receptors made by the cell, and thrown off in the blood-serum. Here they unite with the toxin, and thus permit the receptors of the cell to perform their normal food-taking function. In regard to bacteriolytic immunity, it is found that the blood-serum of certain animals, injected into an animal of another species, occasions the destruction of the red blood-cells of the latter. Blood-serum may by artificial means be made to exert a similar action upon certain bacteria, thus conferring a bacteriolytic immunity.

As Prudden has pointed out, "there seems to be abundant ground for the belief that the protective agencies which are evoked in both natural and artificial immunization, are simply those which the body makes use of in its normal metabolism, exaggerated and diverted to different ends, it is true, in the face of emergencies."

IMPOTENCE.—A condition due to morbid disturbances in the sexual organs of man, rendering him unable to beget children. Distinction must be made between the inability to perform coition and the inability to fecun-

date. The former condition, which constitutes impotence in the true acceptance of the word, may be absolute or conditional. In sterility, although coition may be possible, there is either a complete absence of semen, or the seminal fluid does not contain the spermatozoa necessary to fecundation. The latter condition is due, as a rule, to morbid processes which have led to an obstruction of the seminiferous canals; as, for instance, gonorrhea.

Impotence in the narrower sense, in which the performance of coition is prevented or impeded, may be due to congenital or acquired deformities of the male organ of sex, many of which may be removed by operative means. Severe constitutional diseases (such as diabetes mellitus, inflammation of the kidneys, and morphinism) may decrease or entirely suspend the ability to perform coition. These forms of impotence are generally incurable, as the original disease can rarely be treated effectually. More amenable to treatment are the more frequent cases of so-called "nervous impotence." In this form, although sufficiently strong erections may be present at inopportune times, as well as pollutions at night, the erections are either entirely absent, or incomplete, at the very moment when sexual intercourse is intended. In other cases nervous impotence manifests itself by an irritable weakness in which a discharge of semen takes place before, or during, the introduction of the male organ into the vagina, or even upon the slightest sexual excitement. The rigidity of the organ then relaxes very soon after the emission of the semen, and the performance of coition becomes impossible. These forms of nervous impotence may be due either to masturbation, to irritative conditions, or to obstinate gonorrheas; they are rarely due to excessive sexual intercourse, and still more rarely to neurasthenia.

Conditions of nervous impotence are amenable to medical treatment, although success can not be promised in every case. Treatment must be undertaken only by a physician, as the prospect of recovery depends to a great extent upon the possibility of discovering the causative conditions; and the discovery and removal of the causes are exclusively the concern of a trained physician. Patients suffering from nervous impotence or from frequent emissions should pay no attention to the many advertising quacks who prey upon their minds and their pockets by their misleading literature. The depression of mind that results from this disorder forms a fertile soil for these quacks and charlatans. By their so-called "infallible" remedies and methods, and with a shameless utilization of advertisements in the daily press, these persons know how to extort the last penny from their victims. As a general rule it may be stated that an appropriate psychic treatment by a competent practitioner, combined with a carefully regulated diet as well as with physical treatment by water, electricity, and massage, is able to accomplish much more towards curing nervous impotence, and the neurasthenia which frequently accompanies this condition, than can be accom-

plished by a treatment with drugs, although the latter can not be fully dispensed with in every instance. In all cases of nervous impotence it is necessary to observe a certain abstinence from sexual intercourse, and above all to avoid sexual overexcitement. The so-called "occupation impotence," in which a diminution or suspension of the sexual functions is called forth by bodily or mental overexertion, is merely a temporary affection.

Congenital absence of seminal fluid can not be cured, whereas lack of semen due either to phimosis (see FORESKIN, DISEASES OF) or to narrowing of the urethra, can be cured by operation and by local applications. Temporarily occurring deficiency of semen is somewhat related to nervous impotence, and may be cured by similar methods of treatment (see above).

Inability to fecundate, in the presence of ability to perform coition, is by no means as rare a condition as is generally assumed. It has been stated by Fürbringer that in 35 per cent. of all childless marriages the fault is in the husband; and that in 30 per cent. it is due to the absence of spermatozoa from the seminal fluid. Apart from other affections of the testicles (tuberculosis, cancer, syphilis, contusion, etc.), gonorrheal epididymitis of both sides is an important factor in causing this condition.

With regard to treatment it is impossible to give any general rules. Wasting of the testicles having once begun, a restoration of the seminal secretion is out of the question. All depends upon the cause in each individual case, and how to determine this must be left to a skilled physician. In recent inflammations due to injury, and in syphilitic affections of the testicles, a cure may be expected. Tuberculous affections of the testicle and epididymis of both sides, as well as bilateral gonorrheal epididymitis, do not offer much prospect of recovery. The former disease usually necessitates complete removal of the affected organs, and in the latter malady it is possible only in exceptional cases to reopen the collapsed seminal canals. It follows that nothing can be expected from a cut and dried treatment of the various forms of impotence, and that there can be no infallible remedies for this disorder because of the many causes underlying it. Treatment must be directed to the causative affections; and only a physician is able to determine the conditions of each individual case, and to take the responsibility of prognosis and treatment accordingly.

INCONTINENCE OF URINE.—See ENURESIS.

INCUBATION PERIODS.—Between the time of exposure to infection and the actual appearance of the first symptoms of disease, there usually intervenes a longer or shorter period, which is called the period of incubation (or hatching). In some contagious diseases the length of this period is a definite characteristic of the affection; in others, it may vary considerably. *Asiatic cholera*, for instance, may require an incubation period of five days; or it may develop about twelve hours after the entrance of the micro-organism. *Diphtheria* develops in from two to seven days; *German measles* in

from fourteen days to three weeks; *gonorrhea* in about twenty-four hours; *influenza* in two or three days; *measles* in about fourteen days; *rabies* (hydrophobia) in between three and eight weeks, sometimes considerably later; *scarlatina* in a day or two; *typhoid fever* in about two weeks.

Whenever a person knows that he has been exposed to contagion, he ought to pay particular attention to any symptoms, however insignificant, that may appear during the maximum period of incubation. In the case of children who have been thus exposed, they ought to be kept from school until all likelihood of their having become infected has disappeared. It is always the safest method to wait some days beyond the normal maximum periods. For more extensive information, the various articles on contagious diseases must be consulted.

INDIAN HEMP.—See CANNABIS INDICA.

INFANT, CARE OF.—See NURSING, CARE OF.

INFANTILE PARALYSIS.—See PARALYSIS.

INFECTION.—The exciting causes of contagious diseases are either transmitted directly by the patient, his immediate surroundings, or his excreta; or they are distributed over large areas by the medium of the air. Infection through the air is possible with the readily transportable germs of influenza, measles, smallpox, scarlet fever, whooping-cough, mumps, etc. Where the germs are communicated directly from one individual to another (as in typhoid fever, diphtheria, cholera, tuberculosis, hydrophobia, venereal diseases, etc.), the contagion occurs through the medium of the clothes or various personal utensils, or through insufficient cleansing of the hands before eating, especially when they have been in contact with the sick person or with anything belonging to him. Infection may result also from the ingestion of food materials containing disease-germs, especially water and raw milk; from bathing in streams which are contaminated by the drainage from infected localities; or from using unclean water for washing eating-utensils. Bacteria may be transmitted also by insects, particularly through their stings (malaria; yellow fever), or by their contaminating food or open wounds after having been in contact with infectious materials; typhoid, for instance, is often transmitted in this manner by flies.

The spread of contagious diseases is furthered by lax health-laws, by incorrect methods of living, by inadequate drainage, by lack of pure and wholesome drinking-water, by damp and overcrowded dwellings which lack a sufficient amount of light and air, by insufficient attention to the cleanliness of the body and surroundings, and by neglected or incomplete isolation of patients suffering from contagious diseases. The risk of infection is increased also by the mode of living necessitated by certain callings, and by the diminished resistance of the body resulting from such occupations. Other exciting factors are: severe exertions, sudden changes in temperature, prolonged detention in dry, hot or cold air, working in the water, the devel-

opment of dangerous gases or moisture, abuse of alcohol or other toxic substances, etc., etc.

Measures for preventing contagious diseases, or their spread in any given case, had best be prescribed by a physician who is familiar with the subject and its dangerous aspects. It is essential, therefore, to summon medical aid at once in every suspicious case, so that the patient may be placed under appropriate treatment, and further evil consequences avoided. In cases where disease has been transmitted through the air, the patient should at once be isolated and, if necessary, placed in a hospital. If the patient be a member of a large family, the remaining members, as well as the servants, should not be permitted to come in contact with the patient's nurse, nor to have any communication with her, as many diseases, such as scarlet fever and smallpox, may be readily transmitted through an intermediary. Nurses must observe extreme cleanliness of their persons. They should rinse the mouth frequently, bathe the entire body every day, change their under-clothing oftener than usual, and wear protective gowns made from washable material. Above all, they must not take their meals in the sick-room. The disinfection of the patient's excreta, clothing, and utensils is fully treated in the article on DISINFECTION. The sick-room should always be well aired; it should be thoroughly disinfected after the illness and, if possible, not occupied until several weeks later.

During the prevalence of an epidemic the appearance of bronchial, gastric, or intestinal catarrhs should be given special attention, because the inflammatory condition present in these cases greatly favors the entrance of germs and their transmission through the body. All overindulgence in eating and drinking must be strictly avoided, and a perfectly normal mode of living insisted upon.

Particular attention should be directed to the possibilities of the spread of contagion among certain classes of workmen who handle materials which may contain disease-germs; such as hat-makers, paper-makers, and rag-sorters (see ANTHRAX). The inhalation of dust (whether from metal, coal, stone, flour, or tobacco, etc.) produces a permanent irritation of the lungs and air-passages, which predisposes to the development of pneumonia, tuberculosis, influenza, and other pulmonary diseases, because the resistance of the lung-tissue becomes lowered.

In addition to the ordinary precautions, energetic disinfection of the stools and of the dirty linen is usually sufficient to prevent the spread of typhoid, cholera, and dysentery. During the prevalence of an infectious disease the water used for drinking and washing should be thoroughly boiled, as should also the milk. As it is well known that small wounds of the skin and of the mucous membranes permit the entrance of infectious agents (causing erysipelas, septemia, etc.) such wounds should be treated with the greatest care. Of untold value is the protective vaccination against

smallpox, the omission of which must be looked upon as a crime. The early injection of Behring's serum in diphtheria, and the timely treatment of rabies are also important.

A person suffering from a contagious venereal disease should not be led, by a sense of false shame, to hide its existence, or to seek the aid of a charlatan in its treatment. In this instance nothing but the timely services of a physician are able to overcome an evil which not only endangers the life of the individual, but which may involve also the entire family. As a rule, contagious diseases are most effectively combated by the destruction of their specific germs, by personal cleanliness, by sanitary dwellings, and also by increasing and maintaining the natural resistance of the body by appropriate measures already treated under the caption **HARDENING**. Two other factors, which aid a person in warding off disease, are fearlessness and an energetic will—two qualities which, in addition to other precautions, assist the physician in protecting his own person against infection.

The best way to treat infectious diseases is to prevent them. It is not necessary for children to have them at all. Social conditions may make it difficult for parents to prevent the many possible accidental contaminations, but if all parents were properly informed, and conscientious in their duties to others, much avoidable sickness would be prevented. The father or mother who permits a child recovering from an infectious disease to go to school before the period of possible contagiousness is past, is a true criminal, either through ignorance or intent. What does a week's loss in school amount to in comparison with the hundreds of sick and dying children that may come to such condition from one sick child who returns to school while convalescing? Parents should be more careful; and to curb the careless ones they should support the efforts of enlightened boards of health who demand that medical school-inspectors examine ailing children for possible infectious diseases. Every community, no matter how small, should have its health officer. He is a much more important township official than a road-surveyor. The former can save the lives of those who grow up to be men and women; the latter saves the wagons and the horses a little, and gains time in hauling truck. Which is the more important? But, should an infectious disease be caught, it should be carefully treated. Not one is to be treated carelessly, no matter how mild the patient's symptoms may be.

INFLAMMATION.—The human body is subjected to numerous external injuries of varying degrees, which may cause disturbances in its normal functions. The system is constantly engaged in limiting the effects of such injuries and in restoring the natural conditions; that is to say, in bringing about a cure. One of the processes which takes place in the body as a result of such injury is known by the term "inflammation." This process, which is concerned with eliminating the effects of the injury, tends to run a definite and characteristic course.

Among the various causes of inflammation may be mentioned blows, burns, irritations, and cold; but especially the penetration of toxic bacteria. The body responds to the influence of the injury by sending an increased flow of blood to the part. As a result of this increased supply of blood the vicinity of the injured area swells, and becomes tender and painful; the skin reddens, and a sense of local heat is present; in other words, an inflammation has been produced. Inflammations due to toxic bacteria are the most frequent, and also the most dangerous, because these germs multiply in the body, and the process may spread to such an extent that death results. Inflammation really expresses the effort of the organism to overcome the cause of the trouble; thus, in case of a bacterial invasion the intention is to destroy the bacteria. Inflammation usually results in the formation of pus. If formed in small quantities this pus may be absorbed by the system; but where larger quantities collect it results in the formation of abscesses.

Two types of inflammation are recognized: the acute form which runs a very rapid course; and the chronic form which runs a more protracted course. To the former type belong all the painful inflammations marked by local redness and swelling, and accompanied by fever; whereas the principal example of the latter form is the tuberculous inflammation. Medical treatment aims to support the system as the inflammation runs its course, and thus to favor healing. Whenever it is possible to do so, the cause must be removed, whereupon the body, and particularly the affected part, requires complete rest and protection. Nutrition should be stimulated by the administration of an easily digestible, bland diet. Special remedial measures are indicated according to the variety of the inflammation, and the organ involved; but all these must be prescribed by the physician in every given case.

INFLUENZA (GRIPPE).—An epidemic, infectious disease which is caused by the influenza-bacillus. It develops rapidly with a general feeling of indisposition, headache, pains in the limbs, chilliness, nasal catarrh and cough, and with the formation of herpes (fever-sores) on the lips and face. Influenza either restricts itself to these manifestations and disappears as rapidly as it came, or it progresses and affects in a more marked degree the respiratory passages, the digestive organs, and the nervous system.

An involvement of the respiratory passages is always accompanied with marked nasal catarrh and frontal headache, and with inflammation of the mucous membranes of the eyes, mouth, pharynx, and bronchi. A tormenting cough sets in, the sputum being at first clear and viscid, later becoming purulent. The patient complains of pains in the chest and of difficulty in breathing. More or less marked fever and acceleration of the pulse are present at the same time. If the stomach and intestines are affected, there will be nausea, vomiting, spasmodic pains in the abdomen, and severe, sometimes bloody, diarrhea. Implication of the nervous system results in

pains in the head, in the small of the back, and in the limbs and joints; conditions of excitement, delirium, and insomnia may be present, or there may be unnatural drowsiness. In some instances also the heart may be involved, this complication being manifested by palpitation, pains in the region of the heart, and cardiac weakness.

The course of influenza, which usually averages about a week, may sometimes be protracted for weeks or months, owing to the frequent super-vention of other diseases. The complications most to be dreaded are pneumonia and pleurisy, and the rapid development of hidden or beginning tuberculosis. Other affections that may occur subsequently, are: inflammations of the nerves, paralyses, spasmodic symptoms, affections of the heart, diseases of the eyes or ears, chronic catarrhs of the stomach and intestine, and irritation and inflammation of the kidneys.

The prevention of this epidemic disease is scarcely possible. During the attack it is necessary that the patient remain in bed, with cold compresses (which become warm) on the chest; the diet should be restricted and, if possible, it should consist of milk only. In many cases it will prove beneficial to induce perspiration by giving the patient hot tea and hot lemonade. The greatest care is necessary during convalescence, as too early rising, errors in diet, or renewed colds are very liable to further the development of the complications mentioned.

There are a number of acute febrile affections which occur, especially during infancy and childhood, in consequence of colds, etc. These affections, which set in with chills, fever, depression, loss of appetite, headache, pains in the small of the back, and with the formation of blister-like eruptions on the lips and in the face, last one or more days, and the symptoms may be more or less pronounced. The fever soon recedes, however, usually with the appearance of perspiration, and complete recovery soon takes place. In children these affections are mostly due to digestive disturbances; and a restricted diet and a mild laxative are usually enough to bring about relief.

INFUSIONS.—These are watery extracts of vegetable substances which are not quite soluble in water. The usual mode of preparation is to pour boiling water on the drug, and then to macerate it in a closed vessel until the water has become cool. Infusions may be prepared also by percolation with cold water, but in this case the substance should be finely divided. The strength of an infusion varies, not only with regard to the drug prescribed, but also according to individual cases.

INGROWING NAILS.—See NAILS, INGROWING.

INGUINAL GLANDS, SWELLING OF.—See BUBO.

INGUINAL RUPTURE.—See RUPTURE.

INHALATIONS.—These may consist of cold or warm air, with which may be incorporated various volatile substances; or of cold or warm vapors

containing salts or other medicinal remedies. Finely divided powders are also sometimes used for inhalation.

For the purpose of inhaling pure, fresh air, a change of climate may often be necessary; and if warm, moist air is desired, inland seas surrounded by woods, or southern resorts protected from high winds, should be chosen. Various forms of apparatus have been devised for supplying moist or medicated air for inhalation; and special atomizers are used for impregnating air with medicinal substances. Solutions of salts, tannic acid, pine-needle oil, turpentine, menthol, etc., are often used in these atomizers. A more complicated method of administering medicated inhalations consists in filling a whole room with the needed vapors, which are supplied by special



FIG. 237. Government Hospital for Insane, Washington, D. C. (Administration Group).

apparatus. For the inhalation of steam, an ordinary tall pitcher filled with boiling water may be used.

INSANE ASYLUM.—An institution for the care of mentally deranged persons. Such an asylum answers a twofold purpose. It is intended as a hospital where demented people may receive careful medical treatment with a view to curing them; or, if this be no longer possible, it serves them as a home in which they may receive all necessary care. Hence, insane asylums are hospitals in the true acceptance of the word, and it is very much to be regretted that the public still looks upon them as some kind of prison to which a patient is to be transferred only when there is absolutely no other help. This view, which possibly may have been justified in times long past, is not correct at the present day. In keeping with the progress made in the recognition and treatment of mental diseases, the insane asylums of the present day have also acquired an entirely different appearance, in their exterior as well as in their interior.

A large modern institution resembles a group of friendly villas (see Fig. 237) without enclosing walls and latticed windows; and the interior, with its

pictures, mirrors, flowers, etc., differs but little from a cleanly and comfortably appointed private residence (see Fig. 238). Even where the peculiar character of the mental disturbances renders it necessary to take such precautionary measures as the barring of windows and doors, these grates are so carefully arranged as to be scarcely noticeable. The wards for quiet patients often remain unlocked. Mechanical coercive measures (strait-jacket, etc.) have disappeared; rubber cells do not exist; and padded cells have become a curiosity. Isolating a patient in a "cell" is avoided as much as possible; in many places it is altogether forbidden. The former modes



FIG. 238. Interior of a Ward in the Government Hospital for Insane, Washington, D. C.

of treatment have been displaced by modern and enlightened methods. Any one who for the first time enters the reception room of an insane asylum will believe himself to be in an ordinary hospital. Patients whose condition will at all permit it are employed in the house or in the yard, in the work-rooms, or in the garden. Large institutions are usually connected with extensive agricultural establishments. Simple pleasures, such as excursions, theatrical performances, and dances, are also provided for.

The fear that a patient's condition might become aggravated by intercourse with other demented persons has been disproved a thousand times by practical experience. The patient is usually sufficiently occupied with

himself, and he does not show great interest in his roommates. The well-regulated life in the institution, the trained nursing, and last, but not least, the removal from the conditions which caused his affection, act beneficially upon the patient, and are the most important conditions for his recovery.

INSANITY.—It is important in the first place to realize that there is no single disease which may be called insanity. The word, as such, is more properly a legal and not a medical term. There are a number of diseases which may be grouped under this head, and of late these have been termed



FIG. 239. Operating-Room in the Government Hospital for Insane, Washington, D. C.

the *psychoses*, or diseases of the mind. Diseases of the mind are not different in any sense from diseases of other organs of the body, the only variation being that the symptoms are different because the functions of the brain-substances are not like those of other organs. Thus, irritation in the lung will cause a cough; while a similar irritation of the brain-substance, which may be occasioned by the same factor (pneumonia-bacteria), may give rise to delirium. It is highly important that the layman should recognize that mind-diseases are precisely like any other kind of diseases, and that a person who suffers from an acute attack of mania is not different from one who suffers from an acute pneumonia, and that he should be looked after with as much, if not more, care. Locking him up in a madhouse is inhuman and unnecessary. There is too much superstition still present in the minds of men regarding mental diseases. It would seem that the majority of even

intelligent laymen had not progressed beyond the point when people with mental disease were thought to be "possessed of the devil."

Insanities are of various kinds. Just as with other diseases, some cases are very mild, others very severe. The differences in the structures and functions of the various parts of the nervous system will account for the variations. As a rule all mental disorders run a more protracted course than bodily disorders, because of the finer and more complicated nature of the mind-substances. Briefly expressed, perception, thinking, and acting are the chief mental functions, and in the various forms of insanity the symptoms involve these functions.

The disorders of perception comprise: (1) *Illusion*, or the false interpretation of things actually seen, a condition not at all uncommon in normal life. (2) *Hallucination*, or a perception which has no real foundation. Many hallucinations are due to defects in the eye, ear, nose, or other organ of sense; and in some insane people it may be possible to discover the defect by careful examination, and to remove it by intelligent treatment, thus effecting a cure. (3) *Clouding of consciousness*, a defect of perception, whereby outside impressions are received with difficulty or not at all.

The disorders of thinking are more complex. Some of the most important symptoms are: (1) *Delusions*, or false beliefs. These are not in themselves sufficient evidence of any one type of the insanities. (2) *Obsessions*, or impulsive ideas, or *fixed ideas*. These are very common; and if uncontrolled, or not educated out of the patient, they often result in mental breakdown. (3) *Dream states*, a condition in which the ideas are dreamy and ill-defined. (4) *Flight of ideas*, a symptom characterized by the phenomenon that the train of thoughts, instead of leading to a definite end, is diverted and jumps from one subject to another. (5) *Retardation*, extreme slowness of thinking which may go on to paralysis of thought.

The disorders of action may be characterized by: (1) *Intense psychomotor activity*, seen in violent patients; or there may be (2) *psychomotor depression*, the reverse condition. A third symptom is (3) *stereotypy*, or the repetition of motions. In addition to these common symptoms, the emotional tone may be exalted, or depressed, or degraded; the memory may be defective or exaggerated. Among the many different forms of insanity the following chief types may be mentioned here:

1. Infection Psychoses.—These are such as follow, or occur during, typhoid fever, pneumonia, or other acute infectious diseases. Confusional mental states, with delirium, hallucinations, etc., are very common in the infection psychoses. Many patients recovering from a severe illness refuse to take their medicines. They are suspicious, and fear they are being poisoned. The appearance of such a symptom should be regarded as a sign that the effects of the original disease have been very marked on the mental organs, and should call for a greater care during the convalescence of these patients, or

else a mental defect may persist, perhaps permanently. These patients are not well even when they seem to be well; and they should be kept as convalescents longer than the attending physician himself may think necessary, unless he is a specialist in nervous and mental disorders.

2. Toxic Psychoses.—These may follow alcoholic intoxication, diabetes, Bright's disease, the habitual taking of opium or cocain, and various other forms of poisoning. The alcoholic insanities are extremely numerous and very complicated.

3. Paranoia.—This is the type of insanity which the lay mind often associates with craziness or madness. Usually this disease runs insidiously and is incurable. The delusions may or may not spring from sensory illusions. When they exist without sensory illusions, they are generally found in persons who from their earliest childhood have been abnormal, eccentric, and peculiar. Their peculiarities become more and more pronounced. To this class belong inventors who claim to have solved the problem of squaring the circle, or the problem of perpetual motion; also the "Saviors" and "Messiahs," the "Salvationists" and "Health Apostles," the persons who are jealous without cause, the individuals of "noble descent" who lay claim to this or that throne, and the erotomaniacs who believe themselves beloved by persons of high position and overwhelm them with effusive letters. Such persons frequently possess a fine rhetorical gift, as a consequence of which they always find some stupid followers who swear by them; and during times of political or religious excitement such persons may therefore bring some influence to bear upon the excited masses. The border-line between normal and abnormal persons is very hard to determine in such cases. Many founders of religions have been paranoiacs.

Delusions in consequence of sensory illusions are readily recognized as abnormal even by the layman. There are two main groups in these paranoias: the delusions of persecution and those of egotism. Both conditions may be found in the same patient. The disease develops very slowly. The patient begins to be suspicious and distrustful; he believes every remark to have a personal allusion, feels himself "observed," and everything seems to him to have a double meaning. Sensory illusions follow these first symptoms. The patient hears threatening words, secret whisperings, and sees people talking about him; and through the incessant repetition of these wrong impressions he becomes fully convinced that there is a "grudge" against him. The patient believes he is being followed, and he muses and worries about the cause of this persecution and about his enemies. At one time he may imagine them to be masons, then Jesuits, then the police, or the Social Democrats. After a time he will imagine certain individuals to be inimical to him, and will make efforts to guard himself against them, either by announcement to the public prosecutor or by personal force, even with the aid of weapons. This frame of mind transforms the patient him-

self into a persecutor, and a very dangerous one at that. At this stage of the condition the patient is generally placed in an asylum, where, after months or years, his ideas of persecution develop into a regular system. When this stage has been reached the condition is beyond help. At last, sometimes after decades, the patient becomes quiet and indifferent; he has resigned himself to his fate; his delusions become more and more disjointed and confused, until finally his sad plight ends in a state of dementia.

The so-called **querulous paranoia** is a form of paranoia which is of practical importance, and which is often misunderstood. It is not the quarreling and faultfinding that characterizes this form of insanity, but the manner of doing it. There are plenty of persons who are forever defending with stubborn tenacity their actual or supposed rights, without ever being thought mentally unsound. Yet there is a difference between the mentally sound and the unbalanced. The one of sound mind discontinues his case as soon as all appeals have been exhausted, and does not suspect every legal decision of being based on malice, selfishness, bribery, and treachery. In the querulous person of unsound mind there develops a systematic train of ideas of persecution. He believes all his adversaries to be rascals or knaves, the judges to be dishonorable and corruptible, the witnesses to be perjurers. He sends addresses and complaints to high officials, and receiving no hearing he becomes insulting; he is punished, but continues his insults in spite of sad experience or good advice. Like those insane persons with ideas of persecution already described, the querulous paranoiac believes himself to be the victim of a plot; his rights are disputed, he has enemies who seek his undoing, but he will and he must conquer them. He squanders his entire fortune in the "preservation of his interests"; he writes violent articles to the newspapers; and he assumes the rôle of savior of distressed mankind. If the court pays no attention to him and his insults, he resents the ignoring of his complaints; and he will commit penal acts, shoot innocent people, or smash show windows or mirrors for no other purpose than to get a hearing and again to plead his "rights" in court. In this way the affair is drawn out for years and years.

If the paranoiac finally is placed under the care of a guardian or in an asylum, he finds fresh opportunity for endless complaints and troubles on every occasion. Of course the alienists are in the plot; they also are his enemies and act only from personal motives. Many pamphlets which issue from asylums, entitled "Incarcerated Innocently" or "The Modern Vehmic," come from the pens of these paranoiacs. They are often cleverly written, and find readers who believe in the writer and in his prejudiced representation (for who is not ready to give credence to evil reports!); and these credulous readers wonder how such an "intelligent" man can be put into an asylum. But the fact that these insane persons cut sorry figures in the asylums, and that every alienist would be overjoyed if he could with good

conscience let these lunatics loose upon the world to fresh deeds of foolishness, should warn the public against false impressions and ugly suspicions. The querulous paranoiac as described is actually sick, for he suffers from the delusion of persecution. That he is everywhere at a disadvantage and is treated unjustly has become a settled fact to him. This belief has become incorrigibly "fixed" in him; and this differentiates the condition, like all other forms of delusion, from simple misunderstanding which can always be corrected by the intellect. This idea dominates his thoughts, his feelings, and his will, and stamps upon his personality the seal of mental disease. These paranoiacs are nearly always dangerous lunatics. What makes them more dangerous is that the untrained mind can not perceive the kind of sickness from which they suffer. Even judges do not know this type as well as they should.

4. Dementia Præcox.—This is an important type of mental disease. It is a form of mental breakdown in the young. The French speak of it as "stranded on the rock of puberty," since so many young people go to pieces at that time. This is a disease which fathers and mothers should understand, for it may at times be avoided by adopting a proper mode of living for their children at the first signs of its outbreak, and thus save them for a life of usefulness. The disease usually begins with mental depression and a mild grade of confusion. The afflicted find it hard to take interest in their books, and there is a tiring of voluntary attention (to be distinguished from the laziness of children) which is present even in their play. The memory becomes impaired, particularly with regard to recent events; and a certain emotional deterioration begins to take place. Dementia præcox is a very prevalent type of mental disease. It may be recognized early by experts, and a lifelong dementia and wasted life be avoided.

5. Manic-Depressive Insanity.—This is a prevalent mental disease which corresponds to the disorder which earlier medical authors termed *circular insanity*. Many authors have also used the terms *mania* and *melancholia* for this disease. Conditions of depression are often encountered in the insanities. Manic-depressive insanity, however, is an independent disease which has a well-defined course, and which is strictly differentiated from all the other forms of insanity. It is characterized by an afflicting psychic depression, with great loss of self-reliance, alternating with states of excitement. From the psychic grief of the healthy it is distinguished by either absence or insignificance of external cause, or by the force with which the entire mental and psychic life of the affected person is made subject to the condition for weeks and months. For instance, a mentally sound mother who bewails the death of her child will never, deep as her grief may be, become fully the slave of her sorrow; she is able after a time to console herself and to master her sentiments. Not so, however, the melancholic. Her train of thoughts is riveted to one single point; she has no room for

other interests; her entire imagination is obstructed; her energy relaxes; and whatever she may experience becomes a new source of grief. A very good example of the transition from the normal to the morbid is presented by *homesickness*, which sometimes actually assumes the character of well-developed melancholia.

In many cases the melancholic does not know any reason for his grievous depression. Sometimes, however, the searching and brooding over the source of his gloom gives rise to various morbid ideas; he imagines having committed a sin, and he believes himself to be the most wicked person on



FIGS. 240, 241. Characteristic facial expressions in manic-depressive insanity.

earth, one who will never be able to gain eternal beatitude, but be forever cursed. Or he may fancy that he is impoverished, or that he is suffering from an incurable disease. These thoughts are often added to an anxiety which may become so intense that it leads to acts of violence, to suicide, self-mutilation, or even to bloody deeds against others. The tormenting tension in which the patient has been so far, is broken in this case, about in the same manner as high pressure of steam explodes the boiler. Terrible delusions are also as a rule present in such instances. The patient imagines that he beholds his murderers; he hears the gallows prepared for him; he sees hell with all its terrors; or he hears his children call anxiously for help.

Such depressed patients are dangerous to the utmost. It should be borne in mind that even those patients who are apparently but slightly depressed should never be trusted; for persons who silently suffer their torments, and who for some time do not manifest any symptoms, are the very ones who often end their lives by suicide. Hence, all melancholics, without exception, must be carefully watched, and should be under supervision by night

as well as by day. They require rest and a very careful psychic treatment which, combined with strict watching, can generally be offered only by the trained nursing as practised in an institution. Nothing is accomplished, at least in the severe cases, with the constant "intention to console," even with religious comfort. It would be a still greater mistake to attempt to "cheer up" the patient by amusing him. This would be quite as nonsensical and cruel as sending a mother grieving for the death of her darling to see a comedy. The depressed periods may persist for several months, and then the patient may gradually emerge from his gloom and become normal. These patients, however, may develop other attacks of the same kind, or they may become mildly maniacal, or wildly excited. The maniacal attacks may last a few months, and then clear up as did the melancholic attack. The usual history in these cases is to have several attacks of the disease. Usually the successive illnesses result in some grade of mental deterioration.

Other forms of insanity are *general paresis* (for which see the article BRAIN, SOFTENING OF), and *senile dementia*, which is treated under SENILITY. See also MENTAL DISEASES.

INSECT STINGS AND BITES.—The stings of bees, wasps, and hornets cause redness and swelling of the skin, which usually recede in a few days. Occasionally, when one eats fruit carelessly, the insects may reach the mouth or throat, where their stings often cause great pain. In exceptional cases swelling of these parts has caused death by suffocation. Individuals who are very susceptible to the poison of bees, as well as persons who are attacked and stung by a whole swarm, may manifest severe general symptoms, such as fainting, chills, nettle-rash, vomiting, and diarrhea. Treatment consists in touching the swollen parts with diluted spirits of sal ammoniac, or in the application of bicarbonate of soda. Bee-stings sometimes remain in the wound. When this is the case they should be removed with a needle, care being taken to avoid breaking the poison-gland which often adheres to the upper part of the sting. If the mouth is slimy, the sucking of small pieces of ice will give relief.

Diluted spirits of sal ammoniac, and baking-soda are efficacious also in cases of bites by tarantulas, scorpions, mosquitoes, etc. Protection against the nightly invasion of mosquitoes is afforded only by fine wire- or gauze-netting. Lead-water is a good application in cases of ant bites.

Bees, wasps, and hornets sting only when they are irritated. Striking at them does not drive them away, but, on the contrary, renders them furious. It should, therefore, be avoided; and children should be especially cautioned against destroying the nests of these insects. The best protection in case of an attack by a swarm of bees is to keep absolutely quiet.

INSOMNIA.—See SLEEPLESSNESS.

INTERCOSTAL PAINS.—Pains due to disturbances of the activity of the intercostal nerves. They occur in single attacks on one side of the chest,

especially on the left, and may increase in severity from time to time. They may be due to various causes, such as cold, diseases of the sexual organs, anemia, diabetes, nervous conditions, diseases of the vertebral column or of the ribs, etc. Sometimes they occur without any evident cause. The pains set in suddenly, and are so severe that the patient believes he is suffering from pleurisy. They are increased by violent movements of the thorax, such as those caused by coughing or by deep breathing, and also by pressure at evacuation of the bowels. Examination generally reveals three localities, or areas, where the pains are most severe; namely, the parts adjacent to the vertebral column, the sternum, and the intermediate space. Intercostal pains are conspicuously frequent in conjunction with herpes. The disease may be alleviated by the application of blistering agents (such as spraying with ethyl chlorid), warm poultices, massage, and electricity. Occasionally this condition is very stubborn, but as a rule it terminates favorably. Attention must always be paid to constipation. If the condition be due to any of the diseases mentioned above, the causative affection must naturally be treated. In such cases the final outcome will depend upon the nature and course of the fundamental disease.

INTERMITTENT FEVER.—See **MALARIA**.

INTESTINAL WORMS.—See **FILARIA**; **PARASITES**; **TAPEWORM**; **WORMS**.

INTESTINES.—For anatomy and structure see **INTRODUCTORY CHAPTERS** (pp. 56-57).

INTESTINES, DISEASES OF.—There are a number of affections of the intestines. The most important are **CONSTIPATION** (which see), intestinal catarrh, intestinal occlusion, tuberculosis of the intestine, and tumors of the intestine. Certain diseases in which the intestines are mainly involved, are discussed under their respective headings. See **CHOLERA**; **DYSENTERY**; **TYPHOID FEVER**; etc.

Intestinal Catarrh.—There are two main forms of this complaint: the acute, in which recovery takes place in a few days or weeks; and the chronic, which may extend over months or years. Among the causes of the acute type may be mentioned exposure, indiscretions in diet, and poisoning due to foodstuffs or bacterial toxins. Errors in diet are the most frequent cause, and the condition is therefore most prevalent in the summer months. Intestinal catarrh arises in the same manner as an attack of **CHOLERA MORBUS** (which see), but in the former disease the stomach is involved but slightly, or not at all. The strange fact that dietary indiscretions, and even contaminated food, may produce no symptoms in the stomach, is very likely due to the circumstance that in most persons the stomach is more resistant than the intestine. This is undoubtedly due to the fact that the gastric juice contains hydrochloric acid, which possesses germicidal and anti-fermentative properties. Moreover, the stomach has the property of being able to

empty itself quickly in either direction if it contains any harmful materials. In the intestine such materials remain for a longer period, and a greater opportunity is thus afforded for irritating the sensitive mucous membrane. As a rule the disease process does not involve the entire length of the intestine, but affects only certain portions, such as the large or the small intestine, or perhaps only certain segments of these. The symptoms, however, may be very serious even if only one-tenth of the entire intestinal tract be involved.

The catarrhal process consists essentially of a free exudation of water and mucus from the inflamed membrane, together with a tendency to bleeding. Where the lower segments of the gut are affected, this mucus may be readily recognized, as it coats the fecal masses like varnish; or if the feces are soft or fluid, it makes them stringy. The higher the seat of the disease, the more intimately does the mucus become mixed with the feces; and in certain cases it may therefore be detected only by the aid of the microscope. Even more characteristic than the presence of mucus in the stools, is the soft and thin character of the feces. From a semisolid consistency the evacuations gradually become quite fluid, and contain merely water, mucus, and intestinal secretions. On account of the increased peristalsis which is characteristic of this disease, the food passes through the intestine very rapidly. The stools also contain unchanged biliary secretions; and instead of their normal grayish-brown color, they appear green. In the presence of intestinal catarrh, unchanged parts of the food are excreted within a few hours; whereas under normal conditions the undigested food particles, which are too small to be readily recognized by the naked eye, do not appear in the stools until after an interval of from twelve to twenty-four hours. If this incomplete digestion continues for any length of time, nutrition becomes impaired and the body soon loses in weight. This loss is noted even where an intestinal catarrh has been present for a few days only.

The acute form of intestinal catarrh begins quite suddenly with abdominal pain, colic, and other disagreeable sensations. There may be fever, especially at the beginning of the attack. The appetite is poor, and the patients usually express an abhorrence of all food. An excessive thirst soon appears; but this should not be satisfied, as the ingestion of any quantity of water simply increases the number of the stools. These may follow one another so closely that the individual is permitted scarcely any rest, and is constantly bothered by the distressing desire to empty his bowels. This profuse diarrhea greatly weakens the patient.

Chronic intestinal catarrh usually develops from an acute attack which has been neglected. The transition from one form to the other is often unobserved, for although the abdominal pains diminish, the diarrhea continues, although it becomes less severe. The feces become somewhat more solid, and in some cases constipation may be present for a few days, only to be succeeded by an increased diarrhea. The longer the duration of the

catarrh, the more the intestinal glands lose their power to absorb the nutrient materials of the food, and a large portion of the latter is excreted unchanged. The patient's nutrition becomes affected to such an extent that he presents an alarming picture of emaciation. The skin becomes dry and hard, the complexion pale, the urine scant, and the strength diminished. An organism weakened in this manner soon loses its powers of resistance, and the individual readily succumbs to any intercurrent disease. Chronic intestinal catarrh may be combined with other diseases, especially with chronic catarrhal gastritis, in which affection the inflammation simply extends from the stomach down into the intestine. Cardiac and pulmonary complications may likewise set in, and in this way the prognosis is rendered still more unfavorable.

In treating the acute form of intestinal catarrh, rest in bed and a restricted diet are among the most essential requirements. Complete abstinence from food is the best course to follow on the first day, or the patient may be given warm fluids, such as gruels, tea, or milk, and soft-boiled eggs. After the severe symptoms have subsided, zwieback, white bread, toast, rice, farina, etc., may be administered. Hot, and preferably dry, abdominal applications afford the patient a great deal of comfort; they alleviate the pain and favor the process of healing which usually occupies from three to fourteen days. In order to prevent recurrences, the patient must exercise care in eating, even for some time after his recovery. If the trouble is known to have been brought on by some dietary indiscretion, it is advisable thoroughly to clear out the intestinal tract by the administration of a brisk cathartic which, if necessary, may be followed by some astringent remedy.

The treatment of the chronic form demands strict adherence to a carefully prescribed diet. Even a neglected case may be greatly improved by following such a course for from four to six weeks. When the intestinal glands have become completely atrophied, a complete cure can no longer be expected. When obstinate cases of diarrhea occur in apparently healthy persons, notwithstanding a selected diet, it is more frequently due to the presence of a malignant tumor in the intestine than to a mere chronic catarrh. The main rules for dieting these cases may be summarized as follows: Vegetables, fruits, cake, spices, sugar, sour and sweet dishes or drinks, beer, wine, brandy, rye-bread, fatty meat, cheese, lobsters, and a number of other articles, are to be forbidden. It is permitted to take milk (if no unfavorable effects are observed), soup, gruel, rice, sago, tapioca, farina, white bread, toast, zwieback, crackers, eggs, lean meat or fish, tea, cocoa, chocolate, claret, and selters which has ceased effervescing. The abdomen should always be kept warm by means of a woollen bandage. Warm applications, sitz-baths, and complete body baths are also of value. The necessary drugs must be prescribed by the physician. In obstinate cases irrigations of the colon may be tried.

Intestinal Catarrh in Children.—In addition to the very acute and severe form of catarrh of the gastro-intestinal tract, known as **CHOLERA INFANTUM**, infants may be subject also to a more chronic type, which lasts for a considerable time and resists most forms of treatment. It may develop from the acute variety, or it may assume a chronic form from the very beginning. The most frequent cause of these chronic catarrhs is errors in diet, either with regard to its quantity, its character, or its composition.

In a nursing infant it is almost invariably the quantity of the food which produces the trouble; and the composition of the mother's milk is rarely at fault. Very often the child is given the breast too frequently, on the mistaken supposition that a child must needs be hungry every time it cries. This causes overfilling of the stomach, and likewise of the remainder of the alimentary canal, and gives rise to attacks of spasmodic colic. When the colicky pains cause the child to cry, an inexperienced mother simply offers her breast to the infant again, thus bringing about further stuffing. This increases the trouble and favors the development of a chronic intestinal catarrh. The quality of the milk is affected by suppurative inflammation of the breast; or if the mother allows her milk to become contaminated on account of lack of cleanliness. The composition of the milk may be changed by conditions of nervous excitement or by febrile diseases.

In artificially nourished infants, an excessive quantity of food is likewise an important factor in causing acute as well as chronic catarrhs. The disease may be caused also by giving the child milk which is either too thin, or not sufficiently diluted, during the early months; or it may arise from feeding it with farinaceous gruels before its stomach is able to digest such food. The presence in the food of an excessive amount of fat may assert itself in a fatty diarrhea. An attack of cold is also a frequent source of this trouble. Another cause which is often undervalued, but nevertheless important, is lack of cleanliness on the part of the nurses, either with regard to their own persons or with the child. It must not be forgotten that intestinal catarrhs may occur also as accompaniments or complications of other diseases, especially of rickets.

One of the first indications of a gastro-intestinal catarrh is the child's lack of appetite. This symptom, however, is often overshadowed by its excessive thirst, under cover of which the food may all be ingested. The abdomen then becomes distended and tender, and the child draws its legs up, and cries or moans constantly in a most pitiful manner. At first the stools are merely increased in number, but show little change in appearance. Later, however, they become curdled and green, are mixed with mucus, and have a foul odor; finally they become fluid, and are then passed with a great deal of gas. A small number of children survive the first attack and get well; but the majority develop a chronic catarrh from which they may suffer for prolonged periods before recovery takes place. Death may result

from progressive emaciation, and from the effects of the toxic materials produced in the intestine. Sometimes the thin, foul, mucous stools may alternate with apparently normal evacuations. Aside from the character of the stools, the most noteworthy symptom of intestinal catarrh is the marked emaciation which takes place. All the fatty tissue is lost, so that the poor little mite gradually gets the appearance of a skeleton covered with skin. Boils frequently develop, and also bed-sores in the region of the buttocks, the genitals, or the heels. The voice of the constantly crying, restless and sleepless child becomes more and more hoarse, and finally is nothing but an indistinct moan which in most cases is stilled by death.

In the treatment of an infant ill with gastro-intestinal catarrh, it is extremely important to follow the advice of a physician. The food, which also serves as medicine, must be prepared with the greatest care and precaution, with regard to its character as well as to its cleanliness, and no heed should be given to advice tendered by any other person than the physician. The excessive thirst may be relieved by bland drinks, and the best of these is boiled water to which may be added a teaspoonful of granulated sugar to every pint, or a thin infusion of black tea. The tea is prepared by pouring a pint of boiling water over a teaspoonful of tea, straining after two minutes, and then sweetening with a lump of sugar. This may be taken warm or cold. The sick children must be kept in a clean bed, and soiled linen should be immediately replaced, for in this way bed-sores and furuncles may best be avoided or, if already present, may be prevented from becoming worse. The soiled napkins should be kept for the inspection of the physician, so that he may note the character and progress of the disease. The most important prophylactic measure is to provide pure milk from a well-conducted dairy; and then to observe scrupulous cleanliness with regard to the body of the child and all objects with which it comes in contact. In older children the course of the disease does not vary greatly from that observed in adults.

Intestinal Hemorrhage.—The significance of this condition varies according to the locality from which the bleeding proceeds. Blood which flows from the anus may be derived, not only from various portions of the intestine, but also from the stomach. Its color and composition vary with the extent of intestine which it has to traverse before it reaches the exterior of the body. The hemoglobin is disintegrated by the intestine, wherefore the blood loses its red color; and if it comes from the stomach or from the upper portions of the small gut, it is quite black when it reaches the anus, and gives the stools a very dark or tarry appearance. Blood from the colon remains more or less mixed with the intestinal contents, without losing its distinctive red tint, so that it renders the stools reddish-brown or chocolate-colored. In doubtful cases the admixture of blood in the stools may be detected only by chemical analysis. Even very old, black blood, in which the red blood-corpuscles can no longer be recognized by microscopical examination, may

be diagnosed with absolute certainty by chemical tests which reveal the presence of the coloring-matter, the hemoglobin. Bright red blood can come only from the lower segments of the intestinal canal, particularly the rectum, in which case it does not become mixed with the fecal matter, but is deposited on the outside of the mass. These variations in the color of blood passed with the stools are of great importance in determining the site of the hemorrhage.

The most frequent cause of bleeding from the intestinal canal is the presence of piles, or HEMORRHOIDS (which see). Rectal hemorrhages may be due also to catarrhs or ulcers of the mucous membrane of the rectum, but in such cases the blood passed is much less in amount, and is always mixed



FIG. 242. Intestinal occlusion.
(A loop of gut displaced sideways.)



FIG. 243. Intestinal occlusion.
(A loop of gut displaced upwards.)

with mucus. Rectal bleeding is not uncommonly the first sign of cancer of this portion of the gut; and the condition is very often neglected because it is believed to be due to hemorrhoids. Continued intestinal hemorrhages, however slight, always require a careful examination of the rectum. Ulcers or tumors in the colon may likewise give rise to intestinal hemorrhage, and the appearance of this symptom may often serve as the first indication of their presence. In these cases the bleeding occurs because the walls of the blood-vessels which traverse the sloughing growth become involved in the process of destruction, and consequently rupture. Bleeding due to ulcers or tumors can be stopped only by curing the ulcerative conditions, or by removing the tumors.

Intestinal Occlusion.—*Volvulus* and *intussusception* are closely related pathological conditions, in which the fecal stream is halted at the site of an obstruction so that no further evacuations are possible. Above the point of occlusion an accumulation of fecal material takes place, and this finally reaches such a degree that a reversal of the usual peristaltic current forces it back into the stomach, from which it is eventually vomited. Fecal vom-

iting is a symptom much dreaded by the physician, and in order to avoid it recourse must be had as early as possible to means for providing a natural exit. The attempt should first be made with enemas of various kinds and high rectal irrigations of warm water. These are sometimes successful in restoring the patency of the bowel. If constipation persists, it becomes necessary to seek surgical assistance. This is applied to the production of an artificial anus, usually on the right side of the lower portion of the abdo-



FIG. 244. Intestinal intussusception.
(Introversion of a portion of the intestine into the adjoining part.)



FIG. 245. Intestinal intussusception. (Showing cross-section of Fig. 244.)

men (see ANUS, ARTIFICIAL). Through this artificial opening the feces are excreted, and are collected on pads of gauze or cotton which must be frequently renewed, or in specially constructed receptacles. When the obstruction has been removed and the lumen of the canal is again patent, the artificial anus can be closed; otherwise it must remain open permanently.

Intestinal occlusion may come on suddenly or gradually. The acute variety may arise from the twisting of a loop of gut, from the intertwisting of two or more loops (see Figs. 242, 243), or from the introversion of one segment of gut into another of larger diameter (see Figs. 244, 245). The

peristaltic movement is interrupted at the site of the obstruction; and it may even be reversed towards the stomach and produce fecal vomiting as already described. The intestinal coils above the occlusion become distended with gas and fecal matter, and the whole abdomen, or a part of it, becomes inflated like a drum. Inflammation of the peritoneum may set in, owing to the growth of bacteria in the swollen walls of the intestine. Where the occlusion is due to the gradual encroachment of a tumor, the symptoms are developed more slowly and are less severe in character. Weeks or months may elapse before obstruction results; and this may be only temporary at first, but is certain to recur after a longer or shorter interval, and then becomes permanent.

Intestinal Tuberculosis.—In this disease the tuberculous process is localized in the intestine. It usually appears as a part of a generalized tuberculosis and is rarely the primary focus of the disease. It is characterized by the development of numerous ulcers of varying size, principally in the small intestine. These ulcers result from the disintegration of the so-called tubercles, a name given to the little nodules which are due to the growth of the tubercle-bacilli. In patients afflicted with pulmonary consumption the bacteria gain entrance to the digestive system by being swallowed with the sputum. More rarely they may enter the intestinal tract by the ingestion of infected food, such as milk from tuberculous cattle. The development of intestinal tuberculosis in this manner probably occurs only in children. The tubercle-bacilli are especially liable to invade the mucous membrane of the intestine if a catarrhal condition is present. Months may elapse, however, before the ulcers are formed. The ulcerative process gradually extends into the deeper layers until the serous coat is reached, when perforation into the free abdominal cavity may take place, causing a suppurative peritonitis which rapidly becomes fatal. More commonly, however, the ulcers extend in a lateral direction and may cover the entire internal circumference of the gut, leading later to the formation of cicatricial contractions of the lumen of the intestine. Small adjoining ulcers have a tendency to coalesce and form one large ulcer.

Tuberculous ulcers may exist in the intestine without giving rise to any symptoms. As a rule, however, abdominal pain is present, and very often fever, but the most characteristic symptom consists in attacks of uncontrollable diarrhea. It frequently happens that the patient has from three to ten thin, fluid movements a day, as a result of which he rapidly becomes weak and emaciated. Together with the rapidly progressing pulmonary tuberculosis, the condition usually ends fatally within a few months, although occasionally it may linger for half a year.

The treatment of intestinal tuberculosis constitutes one of the most difficult problems in medicine. A strict diet, similar to that prescribed for chronic intestinal catarrh (which see), is necessary. Rest in bed, and the

continued application of heat to the abdomen are also of value. Among drugs, the best results have been obtained with tannic acid or its derivatives, taken in powder form so that they may reach the gut undissolved and afford protection to the ulcerated surfaces. Bismuth is also employed; and likewise a number of other drugs. By careful treatment it is sometimes possible to alleviate the diarrhea for a time, but recurrences are very frequent. As the pulmonary tuberculosis improves, a change for the better is often seen in the intestinal conditions.

Intestinal Tumors.—Both benign and malignant growths are found in all parts of the intestinal tract from the duodenum down to the rectum. Of the two varieties, the former is the rarer. Benign growths are mainly polypi, and are situated in the small intestine where they form one or more finger-like proliferations of the mucous membrane, which are soft, freely movable, and of varying sizes. These are frequent sources of hemorrhage, and may lead also to constrictions or invaginations of the intestine. As a rule, however, they are harmless, and do not endanger life. The first symptoms of their presence become manifest only when they interfere with the patency of the intestinal canal, causing transitory or permanent occlusion of the gut, which may end fatally unless receiving prompt and energetic medical attention. Rectal polypi are the easiest to treat, because they may commonly be removed through the anal opening, while those situated higher up usually require an abdominal section.

The malignant tumors of the intestine are almost without exception cancerous. Their most frequent sites are the colon and the rectum, but they are sometimes found also in the small intestine. They may reach the size of a man's fist, and may lead to extensive adhesions between the intestinal coils and the surrounding regions. These tumors are hard, present an uneven or nodular surface, and may often be palpated through the abdominal wall, when they may be felt to be more or less movable. Under certain circumstances these tumors may not give rise to any marked symptoms for months; and the first signs of trouble do not appear until they have grown to such a size that they exert pressure on neighboring organs, or produce a narrowing of the lumen of the gut. This results in pain, repeated attacks of intestinal colic, hemorrhages from the bowel, and diarrhea. The patient becomes pale and markedly emaciated. If a permanent occlusion of the gut has resulted, which interferes with the passage of the intestinal contents, the movements of the intestine, as well as the distended loops of gut, may become visible on the surface of the abdomen. These appearances are due to the stoppage of the intestinal contents at the point of constriction, where the peristaltic action ceases because further propulsion is no longer possible. Where the occlusion takes place suddenly, fecal vomiting results, and death may come on very quickly. When obstinate constipation occurs in middle-aged people whose evacuations have formerly been per-

factly regular, suspicion should always be directed to the possibility of an intestinal tumor being present. This state of constipation may be interrupted from time to time by periods of diarrhea, but this is merely due to a transitory restoration of the patency of the lumen of the bowel. The intestinal tumors of most frequent occurrence are cancers of the RECTUM (which see). Growths which have their site at the beginning of the colon, especially if they are small, may give rise to symptoms resembling those due to chronic appendicitis.

The only effective remedy for intestinal tumors is their removal by the surgeon's knife. Success, however, can be hoped for only in the cases of smaller tumors, where no adhesion to the surrounding structures has occurred, and where no cancerous deposits have taken place in other portions of the body. Operation must not be delayed until the patients have become emaciated, but should be carried out at the appearance of the first definite evidences of the disease.

Intestinal Ulcers.—These occur on the inner surface of the gut, and are of varying sizes and shapes. At first they are no larger than a pin-head, but gradually they may become as large as a quarter. In shape they are circular or oval, and rarely irregular in outline. They are always developed in the mucous membrane, and usually remain restricted to this. Sometimes, however, they penetrate the muscular coats and finally the peritoneal covering of the intestine. Whenever the serous coat of the gut is involved, there is constant danger of perforation into the peritoneal cavity. The entrance of fecal matter into this cavity brings about a purulent peritonitis which rapidly proves fatal. This accident, however, is often prevented by the fact that the irritation produced by the gradually deepening ulcer causes an inflammatory deposit at the site of the threatening perforation; and this deposit forms a close adhesion between the peritoneum and the ulcerous spot. These adhesions are the natural means of protection for the peritoneum.

The following types of intestinal ulcers may be distinguished: (1) Tuberculous ulcers, which form part of the pathological process described under intestinal tuberculosis (which see); (2) typhoid ulcers; (3) dysenteric ulcers, which are usually found in the large intestine, whereas the two former types are met with almost exclusively in the small intestine; (4) syphilitic ulcers; (5) gonorrheal ulcers, which are produced by a transmission of gonococci from the genitals; (6) carcinomatous ulcers, due to the disintegration of cancerous growths; and (7) ulcers resulting from urinary intoxication in the presence of chronic inflammation of the kidneys. Syphilitic and gonorrheal ulcers usually develop in the rectum. All these ulcers, particularly the syphilitic and the gonorrheal forms, have a tendency to produce a cicatricial contraction of the lumen of the gut. They also keep up, for weeks and months, a purulent, blood-mixed discharge which greatly weakens the patient. Very often there is present also a chronic diarrhea.

In typhoid the small intestine may present from ten to twenty or thirty ulcers in various stages of development. In each case the symptoms vary with the cause and variety of the intestinal ulcers present. Either suppuration, hemorrhage, or diarrhea may be the most prominent symptom; or these symptoms may be combined in various ways. Sometimes the abdomen is tender and painful to the touch. If intestinal occlusion be present in addition to the ulcers, the symptoms of this condition are superadded.

From what has been said in the foregoing, it is very evident that no one set of rules can be formulated for the treatment of intestinal ulcers. The physician must be governed entirely by the circumstances associated with each particular case. Some of these ulcerations, for example those found in typhoid, may heal without leaving any trace of their existence; but the majority either fail to heal, or do so with the formation of scars. The original disease which caused the formation of the ulcers often results fatally, as in tuberculosis or cancer. In these cases the ulcers remain unchanged until the termination of the disease.

INTOXICATION.—See ALCOHOLISM.

INTUSSUSCEPTION.—See INTESTINES, DISEASES OF.

IODIN.—A non-metallic element obtained from the ashes of seaweeds. When prepared it exists as bright lustrous scales, purplish, grayish-black, or bluish-black in color, sparingly soluble in water with the formation of a dark yellow or brownish-yellow solution. Iodin is an important constituent of the human body, being found throughout the tissues, but more particularly in certain glands, notably the thyroid gland, where it is combined with a peculiar albuminous substance (*iodothylin*) which is thought to be responsible for the characteristic action of the gland. Iodin is very widely used in medicine for a vast variety of purposes. Its solution in alcohol, termed the tincture of iodine, is an active antiseptic and counter-irritant, being painted on sprains and dislocations, and used in a weak solution as a wash for infected or foul wounds. In the form of potassium iodide it is widely employed internally as an alterative, particularly in the treatment of syphilis, in chronic rheumatism, and in chronic conditions of glandular swellings, and degeneration of blood-vessels. It is, furthermore, used to relieve spasmodic affections in a number of the hollow organs, notably in spasms of the bronchi (causing asthma), and in disturbances of the bladder. It has a wide range of applicability also in a number of chronic pains. The use of iodine for a protracted time leads to gastro-intestinal irritation, to the formation of pimples and eruptions in different parts of the body, to various other skin-disturbances, and to swollen gums, fetid breath, and a form of poisoning known as chronic iodism. The withdrawal of the remedy naturally brings about an alleviation of all symptoms. Within recent years a large number of iodine preparations have been placed on the market, most of which are antiseptic in their action.

ODOFORM.—A combination of iodine and a hydrocarbon, being a substance analogous in chemical composition to chloroform, but in which iodine is used instead of chlorine. It is a bright yellow powder with a very peculiar odor, very disagreeable to most people. It was once extensively used as an antiseptic dressing for ulcers, but has fallen into a certain amount of disfavor because of the objectionable odor, and because equally effective iodine preparations have been made which do not possess this drawback. Iodoform used in large doses, even locally, may be followed by poisoning, and it should therefore be ordered only by a physician who will watch its action carefully.

IPECACUANHA (IPECAC).—The root of the *Cephaelis Ipecacuanha*, a shrub growing in Brazil. It contains two similar alkaloids called *emetine* and *cephelaëline*. Ipecac is a local irritant. Taken internally it provokes vomiting, both by its irritating effect on the stomach and by its action on the nerve-center governing the movements of vomiting. It increases the flow of saliva and the secretion of mucus in the bronchial tubes. It is used in medicine as an emetic for an overloaded stomach, or when it is desired to get the relaxing effect of vomiting, as in spasmodic croup. Small doses will often stop vomiting when it is not due to irritation of the stomach. Ipecac is a very valuable remedy in tropical dysentery. It is useful in the early stages of bronchitis, and is often given with opium, in the form of Dover's powder, to break up a cold. The wine of ipecac is given in half teaspoonful doses, or three or four times that amount if the emetic action is desired.

IRIS.—The rhizome and rootlets of the Blue Flag, or *Iris versicolor*. It is a purgative which is occasionally given in combination with other drugs. The dose of the extract is two to four grains.

IRIS, INFLAMMATION OF.—See EYE, DISEASES OF.

IRON.—Iron as a metal is not used in medicine, but in the form of many of its soluble salts it has a very wide application. Iron serves a very important physiological function in the human body, being the active agent in the exchange of oxygen which takes place between the tissues and the air. It is found throughout the entire body, but is chiefly located in the hemoglobin of the blood. If for any reason the quantity of hemoglobin in the blood is diminished, a condition of anemia results. This condition may be primary, that is, due to disease of the blood-making organs; or it may be secondary, *i. e.*, due to detrimental influences, acting on the entire nutrition of the body, and particularly on the blood. A full description of these conditions will be found in the article on ANEMIA. Iron is of particular service in the treatment of secondary anemias, but of less value in the primary anemias. It is thought that iron, on being taken into the body, is changed in the stomach into the form of a chlorid of iron, and then modified into an albuminate. It is taken up by the epithelium-cells of the duodenum,

PLATE XII.—SHOWING VARIOUS AFFECTIONS OF THE EYE

1. Ox-eye (pupillitis)
2. Method of detecting foreign body
3. Foreign body in conjunctiva
4. Granular conjunctivitis (trachoma)
5. Sty (chalazion)
6. Right internal strabismus (squint)
7. Sty on eyelid



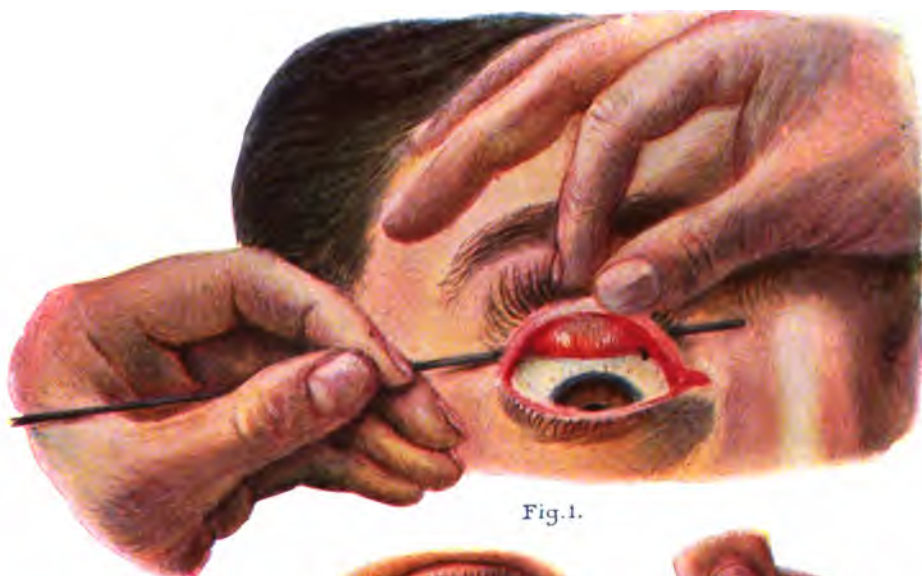


Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

enters into the portal circulation, and is stored up in the spleen, liver, and mesenteric lymph-nodes, from which places it is supplied to the rest of the body through the medium of the blood. The chief organ for the collection of iron is the liver; and this organ serves not only to store up the iron, but also to break it down, for large quantities of broken-down blood-pigment are found in the bile.

A number of iron preparations are very active astringents, and are used locally to stop bleeding and to prevent mucous discharges. The majority of the iron salts are used as indicated in the treatment of altered conditions of the blood. Many of the iron preparations, when taken internally, tend to produce constipation; and many of the soluble preparations, particularly the chlorid, are apt to stain the teeth when brought into contact with them. Iron, no matter in what form it is taken into the body, if able to be converted at all, can be utilized. The so-called organic irons are no more efficacious than the inorganic.

ITCH, THE.—See SCABIES.

ITCHING.—This condition may be caused by various harmful agencies affecting the skin. Among the most frequent causes are various kinds of vermin (fleas, bedbugs, lice, etc.). Not only those places itch which are stung by these insects, but even remote parts may be affected. Spiders and hairy caterpillars, crawling over the skin, may give rise to similar sensations. Itching occurs also in a number of internal affections; and it is a regular symptom in many skin eruptions, as eczema, nettle-rash, etc.

In a few skin-diseases proper, the affection is a tormenting one, and can be relieved only by scratching. In one of these, called *prurigo*, the itching may begin in the first year of life. An eruption of red spots and small pimples, which are scratched, open immediately after they appear. This affection may persist throughout life, with occasional improvements during the summer months. The eruption is located principally on the front surfaces of the legs and on the outer surfaces of the arms, the inner surfaces remaining unaffected. Continued scratching causes the skin to become dry, thick, hard, of a brown discoloration, and covered with crusts. Owing to the constant irritation it frequently happens that eczema is superadded. This causes a crust to form, and increases the itching and the other symptoms. Frequent bathing, and rubbing with simple ointment, give slight relief.

A second variety of itching of the skin may be present without the pimples. It shows a similar location. Itching occurs spontaneously in different parts of the body, at first as a slight tickling sensation, which soon is intensified to such a degree that the unfortunate patient rubs the affected parts with his garments; often, regardless of his surroundings, he may uncover his body to scratch himself with his nails. This nervous itching becomes especially obnoxious when it affects the genitals and the anus.

Here the skin becomes red and thick in consequence of the scratching; eczema sets in; and a mucous secretion takes place from the rectum and from the vagina. Parts of the skin affected by itching become darker in color, and filled with bloody spots. These cases are best treated by a physician. Some alleviation may be obtained by the use of cool compresses and baths, and by washing the parts with vinegar and water, diluted alcohol, or spirits of peppermint. In this affection it is important to consult a physician at the earliest possible moment, as the itching may be a symptom of an internal disease (for instance, of the stomach, intestines, liver, or kidneys, or of the female genital organs). Many cases are due to the itch. See SCABIES.

J

JABORANDI.—See PILOCARPUS.

JALAP.—The tuberous root of the *Ipomœa purga*, a vine growing in Mexico. Its active principle is a resin known as *convolvulin*, which is not unlike scammony. Jalap is a laxative producing a large watery stool. An overdose will cause violent vomiting and purging. It is usually given in combination with other drugs. Compound jalap powder contains thirty-five parts of jalap and sixty-five parts of cream of tartar. This is frequently used in the treatment of dropsy. The dose is from five to thirty grains.

JAUNDICE.—A morbid condition manifesting itself by yellowness of the external skin, the conjunctivæ of the eyes, and of the fluids and tissues. Jaundice is not an independent disease, but merely a symptom of other affections, either of the liver or of some other organ. When the bile is prevented from flowing into the intestine it becomes absorbed into the blood, through which medium the bile-pigment is circulated throughout the tissues, giving rise to the yellow color. The bile not being discharged through the intestine as usual, the excrements become clay-colored; whereas the urine discharging the bile-pigment accumulated in the blood becomes dark in color, like porter. A very troublesome itching of the skin is almost invariably present. Vomiting, nausea, diarrhea or constipation, loss of appetite, an offensive taste in the mouth, flatulence, belching, and pains in the region of the stomach may also be accompanying symptoms. Jaundice is caused by affections of the biliary passages, such as catarrh or gall-stones; by narrowing of the bile-ducts in consequence of pressure exerted upon them by tumors, accumulated excrements, or far-advanced pregnancy; or by affections of the liver. It may be induced also by diseases of the heart, of the blood-vessels, or of the nerves; by mental emotions; by poisoning; by puerperal fever; and by infectious diseases, such as typhoid fever, erysipelas, pneumonia, etc. What is commonly designated as simple jaundice, however, is usually the result following an inflammation (catarrh) of

the mucous membrane of the intestine or of the bile-ducts. Jaundice is occasionally observed to occur almost simultaneously in a great number of people; as, for instance, in soldiers or in prisoners. In such cases one may speak of an epidemic of the disease.

Jaundice is frequently present in the new-born, or it may develop during the first days after birth. The course of this affection is mostly a favorable one. The infants enjoy a good appetite, the stools are unchanged, and the yellow color of the skin usually disappears inside of two weeks. It is only in exceptional cases that jaundice endangers the life of the infant; and in such cases it is probably associated with affections of the navel.

Jaundice of adults sometimes disappears after a few days, but at other times it may persist for months or even for years. If the symptom prevails for more than four to eight weeks, or if it should increase in severity, a serious disease is sure to be the true cause of the condition. Nevertheless, it may still terminate favorably. The first manifestation of recovery consists in a yellowish color of the stools. Then the urine also regains its normal appearance. If recovery does not take place, jaundice often results in death, although it has happened that convalescence has set in after the affection had existed for several years.

The treatment of jaundice is either medicinal or dietetic, although it may often be necessary to combine both methods. Only a physician is able to decide whether an attack of jaundice is due to a slight gastro-intestinal derangement, or whether a serious disease endangering the life of the patient is at the bottom of the condition. It is necessary, therefore, always to have recourse to medical assistance. Existing catarrhs of the stomach require a strict diet consisting of toast, zwieback, bland soups, vegetables, and stewed fruits; later, eggs and lean meat may be added. Fatty foods must be strictly avoided. Intestinal catarrhs likewise demand dietary treatment, and in addition to this the stools must be carefully regulated; this may often be accomplished by water enemas. Mineral waters (selters, vichy, etc.) are useful. The tormenting itching of the skin may be alleviated by washing with cold water to which citric acid (lemon juice) or vinegar has been added; or by warm baths with the addition of soda. Obstinate attacks of jaundice may require the use of special mineral waters from European or American spas. In many instances jaundice is due to gall-stones, in which cases the patients require surgical help.

JAW, DISLOCATION OF.—This may be brought about by opening the mouth overwide, as in yawning, or by accidental blows or falls. The patient's mouth remains wide open, and the saliva flows out without hindrance. It is usually easy for a physician to effect a reduction; but it is not advisable to try the popular method of doing this by striking the chin. Individuals in whom dislocation of the jaw is apt to recur should avoid excessive yawning.

JIGGER.—See SAND-FLEA.

JOINTS.—For anatomy and functions, see **INTRODUCTORY CHAPTERS** (pp. 38-41).

JOINTS, DISEASES OF.—Affections of the joints are very common. Dislocations are of frequent occurrence, while simple swelling as a result of injury is an every-day event. Chronic joint-affections are usually tuberculous in nature. Only a few of the more important joint troubles are here considered.

Effusion of Fluid.—An accumulation of fluid may take place in a joint in consequence of inflammation (see the paragraphs following).

Inflammation.—This is usually a very serious affection, the more serious the larger the joint involved. The seriousness is due to the fact that the function of the affected joint may become impaired, and that even stiffness, with its attendant disability, is liable to set in. In some cases the affected joint, instead of becoming stiff, becomes too movable (shaky), so that it is necessary to apply supporting apparatus in order to render the joint fit for some use. Some diseases of the joints cause severe destructions, so that it eventually becomes necessary to remove the affected bones of the joint. The severest cases may even necessitate amputation in order to preserve the life of the patient. It is obvious, therefore, that in cases of inflammations of joints, it is of the utmost importance to call a physician as early as possible. Nor should the patient lose courage and hope even if recovery or improvement be long delayed. Inflammations of joints are protracted affections which often require months, or even years, to be cured.

Not all cases are uniformly severe. In the first place the nature of the effusion which accumulates in the affected joint must be considered. If the effusion be a watery one, the affection, as a rule, is not very serious. The joint becomes swollen, but not red and hot. The disease is more dangerous, however, if a purulent effusion develops. The patient is then usually feverish, and can move the joint only with great pain. It is swollen, and the skin covering it is red and hot; frequently the swelling has a doughy consistency on pressure.

The cause of the inflammation is of the utmost importance. Certain diseases, especially tuberculosis, syphilis, acute rheumatism, and gonorrhea, give rise to very severe inflammations. Many inflammations which run a slow course are due to tuberculosis which originates either in the bone or in the membrane of the joint, and which may cause extensive destructions in the joint. Inflammations of the hip-joints and knee-joints in children are often tuberculous in nature, and are distinguished by a particularly protracted course. Naturally, the treatment of the various forms of inflammation of joints is quite varied. Massage and medico-mechanical treatment are indicated in some instances; whereas absolute rest of the joint in an appropriate bandage may be in order in other cases. In many cases, especially in the purulent ones, immediate operation is necessary in order

to drain the pus. Others may require surgical interference only in the course of time; and this is especially the case in tuberculous inflammations. It follows, therefore, that only a physician or a surgeon who is familiar with the different forms of the disease, and with their proper treatment, is able to take the steps necessary to benefit the patient.

Swelling.—In the preceding paragraphs it has been emphasized that inflammation of a joint is a frequent cause of swelling. Other common causes are injuries, such as blows, contusions, or sprains. Articular rheumatism (acute as well as chronic) may likewise give rise to swellings of the joints. When the swelling is the result of an injury it is caused by an extravasation of blood, which is located either in the soft parts covering the joint, or in the joint-cavity. If located in the joint-cavity the extravasation may be removed by massage, or, if this proves ineffectual, by a slight operation consisting in introducing a hollow needle into the joint, thus draining the blood. After the operation it is necessary to cover the joint with a bandage, and to keep it at rest. Many swellings located at a joint do not involve the joint itself, but are swellings of the mucous pouches (*bursæ mucosæ*) which are situated over the joints. Such swellings of the *bursæ* occur especially at the joints of the shoulders, knees, and wrists. In simple swellings due to injury, such as spraining the ankle, etc., hot-water applications afford much relief. They may be applied by means of hot cloths or by the use of hot-water bottles.

Joint-Mouse (Floating Cartilage).—Term used to designate a small piece of bone or cartilage which, owing to inflammatory processes in a joint, has become separated so that it is freely movable within the joint-cavity. It may consist also of an inflammatory growth which has become detached from the joint-membrane. The most disagreeable manifestation of the presence of such a joint-mouse occurs when it becomes wedged between the bones of the joint, causing violent pain. Usually, in such cases, the joint can not be moved, but remains fixed in a certain position. Many patients soon learn to execute certain movements which cause the joint-mouse to spring back into the joint-cavity, thus bringing about the former movability. The frequent wedging of the joint-mouse between the bones of the joint gives rise to considerable irritation which may cause a watery effusion to form; and this, in the course of time, will lead to a loosening and relaxation of the joint. This condition, which is very disagreeable, most frequently affects the knee-joint, greatly impairing the ability to walk. The only successful treatment consists in removing the joint-mouse. Owing to the progress made in the treatment of wounds this is not a dangerous operation; but it should be performed only by a practical surgeon.

JUNIPER.—The fruit of an evergreen tree, the *Juniperus communis*. It contains a volatile oil, and a resinous compound called *juniperin*. Juniper is a stimulant to the kidneys, increasing the flow of urine. It is too irri-

tating to be used if there is any active inflammation of the kidneys; but in chronic conditions, or in simple congestion, it is very useful as a mild diuretic. Gin contains a certain amount of juniper. The spirits of juniper may be given in teaspoonful doses.

K

KAMALA.—A reddish-brown powder composed of the glands and hairs from the capsules of an Oriental plant, the *Mallotus Philippinensis*. It contains two substances, *kamalin* and *rotlerin*, but it is not known which of these is the more active principle. Kamala is used as a remedy for tapeworm and roundworm. Being an active purgative it is not necessary to follow it with any laxative. The dose is a teaspoonful, and it is often combined with hyoscyamus to prevent griping.

KAOLIN.—This is a porcelain-clay, chemically known as *aluminum silicate*. It is a soft, whitish powder which is insoluble in water and quite inert chemically. For this reason it is used as a basis for pills of easily reducible substances, such as silver nitrate, which would be altered immediately if mixed with any of the vegetable powders. Clay is also widely employed as a basis for ointments; and when impregnated with antiseptic substances it makes a clean and efficient antiseptic dressing for infected wounds, such as cuts, ulcers, etc.

KEPHIR AND KUMISS.—Beverages which have been introduced into western countries from the Asiatic domains of Russia, as remedies for consumption. They have been designated as milk-wines, because they are prepared by fermentation. In their native countries they are prepared



FIG. 246. Bottle in which to prepare kephir.

from mare's milk; in western countries, from cow's milk. The method of making kephir is the more simple one for domestic use, as it is sufficient to add to one pint of milk a tablespoonful of kephir granules (which may be obtained in some drug-stores), and to leave this mixture, which must be frequently shaken, from one to three days in a moderately cool place. It should be prepared in a strong bottle with a close-fitting, patent stopper (see Fig. 246). Kumiss, on the other hand, is best made by a qualified manufacturer. If it be desired to make it at home, reliable formulas may be found in most cook-books, but the purchased article is to be preferred. In the United States it is made from milk and yeast. The more nutrient constituents of the milk are preserved, and

the sugar is converted into carbon dioxide gas and lactic acid, rendering the beverage sparkling, and giving it a mildly acid taste much liked by some people.

Kephir and kumiss are valuable in the treatment of anemia, consumption, scrofula, persistent constipation, intestinal catarrhs, and scurvy. Neither of these beverages, however, should be taken unless the patient's kidneys and stomach are healthy. At the beginning one bottle a day should be taken, gradually increasing to three bottles of kephir a day, and more of kumiss.

KIDNEYS.—For structure and functions, see **INTRODUCTORY CHAPTERS** (p. 59).

KIDNEYS, DISEASES OF.—The kidneys being organs of very complex structure, it is natural that they may become diseased in various ways. Only the more important affections of these organs are here discussed.

Bright's Disease.—Inflammation of the urinary tubes, causing degeneration of the kidneys. This affection has been so named after an English physician, Richard Bright, who first described it (1827). The disease may be either acute or chronic. The acute form occurs as a complication in many infectious diseases, such as diphtheria, measles, smallpox, typhoid fever, pneumonia, malaria, and pyemic and septic fevers (especially scarlatina); and also after severe exposure and colds. It may be brought about also by dwelling in cold and damp rooms, and by poisoning with acids, highly irritating ethereal oils, cantharides, etc. The onset of the affection is usually characterized by changes in the urine and in the general health. The disease appears either suddenly, with fever, violent chills, vomiting, difficulty in passing the urine, and pains in the regions of the kidneys; or it sets in very gradually, with weakness, severe headache, nausea, marked pallor, and with symptoms of dropsy in the face, the hands, and the feet. The urine, which is passed in small quantities, contains much albumin, and is pale red to brownish-red in color; on standing it deposits a sediment which contains a great deal of blood.

The chronic form of the disease may be the result of an acute attack of the affection; but generally it develops slowly and insidiously. All the causes mentioned under the acute form may be factors also in bringing about the chronic type. It is most frequently incurred by repeated exposure to cold or drenching, by dwelling in cold and damp rooms, by the constant ingestion of food which irritates the kidneys (spices, for instance), by the abuse of alcohol, and by long-lasting suppuration, pulmonary tuberculosis, and syphilis. The course of the disease is often concealed under the symptoms of catarrh of the stomach, pallor and anemia, severe headache, shortness of breath, and general weakness; or it may manifest itself by the development of **DROPSY**, and **UREMIA** (which see), and by palpitation, enlargement, and weakness of the heart. Only expert chemical and micro-

scopical examination of the urine will lead to correct diagnosis of the affection. Chronic Bright's disease may terminate in recovery in a year or two; but some patients may have the disease for twenty years, or even longer. The prospects of cure are favorable with appropriate treatment, but are greatly impaired by neglect and by the supervention of serious complications.

In order to prevent attacks of Bright's disease, careful regulation of the general mode of living is of great importance. Bodily overexertion, constant dwelling in cold and damp houses, and repeated exposure to rain and cold, may be harmful in this as well as in other respects. Occupations which expose the body to cold and wetting should be avoided. After a drenching it is important to remove the wet clothing as soon as possible, to rub the body with warm and dry towels, and to put on dry garments. The general mode of living, and the use of stimulating foods greatly influence the activity of the kidneys. From early youth the body should be hardened by cold ablutions and regular exercise; and scrupulous cleanliness should be observed. These precautionary measures are of great value in enhancing the resistance of the body, because of their stimulating action upon the vital functions. Excessive eating, the inordinate and continued use of meat diets and of strong spices, and the excessive drinking of alcoholic beverages, coffee, and tea, cause marked irritation of the kidneys, and may give rise to chronic inflammation. Even a single excess may be followed by injurious consequences.

Owing to the intimate relations existing between the urinary and the genital apparatus, affections of the latter demand the immediate and most careful medical treatment in order that harmful reactions upon bladder and kidneys may be avoided. Care should be taken never to retain the urine for any great length of time. One should always yield to the call of nature at once, without being influenced by social regards and misguided modesty. Forcible retention of urine may be followed by very disagreeable consequences. In cases where catheterization is necessary, as in narrowing of the urethra, enlargement of the prostate gland, and inflammations of the bladder, it is of great importance to observe the utmost caution and the most scrupulous cleanliness, especially if the patient himself attends to the catheterization (see **CATHETERISM**). In order to prevent changes in the position of the kidneys from taking place, women should avoid too early rising after childbed, especially when the abdominal wall is abnormally relaxed, as after repeated childbirths. Tight waist-bands and corsets should likewise be avoided at such times.

In the treatment of all kidney-diseases (or in cases where it is suspected that such a disease may be present), an examination of the urine is absolutely necessary. A microscopical examination of the urine and an interpretation of the findings should be undertaken only by a scientifically

trained physician, as it is possible to do this only upon the basis of an accurate knowledge of the conditions of the urinary secretions in health and in disease. If a correct diagnosis of an affection of the kidneys has in this manner been made by a medical practitioner, it is necessary, above all, to care for the affected organs. This not only requires bodily and mental rest, but also a careful regulation of the diet. In addition to the directions given by the physician in each individual case, a warm bath (86° to 96° F.) may be taken every half hour or hour, with subsequent wrapping of the entire body in woolen blankets. Such baths stimulate and facilitate the excretion of the water detained by the diseased kidneys, as well as of the dissolved urinary constituents. In recent cases of chronic Bright's disease a prolonged sojourn in a warm climate, with absolute rest and a careful diet, is often followed by remarkably good results.

Cancer of the Kidneys.—This affection occurs most frequently in individuals well advanced in years, although it may occur also in middle-aged persons. The first manifestation of the disease may consist only of pains in the region of the loins. These are later followed by the development of a painful, immovable tumor which can be felt through the abdominal wall, and which may even bulge out in the lateral part of the abdomen. The pressure of this tumor may cause pain located in the abdominal wall, and this pain may radiate forward into the genital organs or into the thighs. This symptom is not infrequently accompanied with the excretion of urine containing blood. The general health of the patient also suffers from the growth of this malignant tumor. Pallor of the skin and of the mucous membranes, loss of appetite, emaciation, and decline of strength characterize the pernicious effects of renal cancer in an advanced stage of the disease. The patient's life can be saved only by operation which must be performed after an early recognition of the affection.

Congestion of the Kidneys.—Engorgement or congestion of the kidneys may occur temporarily after a cold bath, drenching, bodily overexertion, forced marching, etc.; or it may be a permanent condition as a symptom of certain disturbances of the circulation in affections of the heart-muscle or of its valves, in severe cases of calcification of the veins or arteries, or in certain lung-affections. When it occurs as a symptom of circulatory disturbances, severe manifestations are usually present. There may be slight bluish discoloration of the face, congestion of the lungs (resulting in shortness of breath, and in violent cough with the discharge of whitish-red sputum), swelling of the liver, and swollen feet and hands. In these affections the blood is congested in the kidneys, causing an impairment of their urine-secreting functions, and as a result of this the discharge of urine is but scanty. The urine is usually dark red, and thick; and upon standing it may form a conspicuous brick-red sediment. It should, however, be remembered that all urines, even that of an absolutely healthy individual,

will show a brick-dust deposit upon standing for any length of time in a cold room. Usually the urine contains small quantities of albumin, rarely of blood.

These secondary congestions require treatment of the underlying disease. Primary congestions due to exposure or cold, or to the effects of irritating poisons (chloroform, ether, phosphorus, etc.), should be treated with great care. Rest in bed, warm applications to the loins, and a restricted liquid diet are the essentials.

Contraction of the Kidneys.—This affection is characterized by its exceedingly slow and chronic course, and by the excretion of large quantities of light, slightly albuminous, and somewhat cloudy urine. As much as three to four quarts may be passed in one day. Dropsy is usually entirely absent; but the condition may frequently be accompanied by uremia, and by all the other disturbances described under chronic *Bright's Disease*. Cerebral hemorrhages are not rare in connection with contracted kidneys. Among the causes which give rise to the affection may be mentioned calcification of veins and arteries, gout, lead-poisoning, and syphilis.

Dropsy of the Kidneys (Hydronephrosis).—An affection which occurs principally in women, and which may involve either of the kidneys. It is characterized by an accumulation of urine above the point of an obstruction brought about by an impediment in the ureter or in the bladder, thereby leading to a dilatation of the affected part and, finally, to a pouch-like distention of the pelvis of the kidney. Large tumors may develop in this manner, often containing several quarts of urine. The damming of the urine, and the consequent pressure upon the kidney, may eventually lead to an impairment of the secreting functions of the organ; in some cases it may even lead to degeneration, or to complete wasting, of the kidney-tissue.

The disease may result from twisting or bending of the ureter in floating kidney; or it may follow an obstruction of the ureter by a stone, or compression of the ureter by a tumor. It may be due to an antecedent inflammation of the pelvis of the kidney, to displacement of the womb, or to narrowing of the urethra. The chief symptoms consist in sudden vomiting, headache, sensations of pressure and pain in the region of the affected kidney, diminution in the amount of urine voided, and the formation of a swelling in the side of the abdomen. Pressure or change of position may lead to a sudden decrease in the size of this swelling, accompanied with profuse discharge of urine. Treatment can be carried out only after the cause of the affection has been accurately determined. Surgical treatment offers the only cure.

Floating Kidneys.—The kidneys, like all other abdominal organs, are fastened in their position in the abdomen. If a kidney break loose from its anchorage it tends to sink; it changes its position constantly, according to the position of the patient, and thus gives rise to many symptoms of

disease. Floating kidney is seen very frequently in women between the ages of twenty-five and forty-five, mostly affecting the right side. It is caused by the disappearance of the fat which surrounds the kidney and holds it in place. This condition arises in connection with all wasting diseases, with rapid emaciation, or from relaxation of the abdominal musculature. The last-named cause may result from repeated childbirths, from getting up too soon after confinement, from the tension exerted by the intestines upon the suspensory ligaments of the kidney, or from disease or change of position of the female sexual organs. Other frequent causes are tight lacing, severe physical labor, and the lifting of heavy objects.

In many cases floating kidney gives rise to only slight symptoms, or to no symptoms at all; in others, very unpleasant conditions ensue. As a rule the patient complains of nervousness, general uneasiness, frequent malaise, heaviness, and of pressure and slight pain in the abdomen. Walking and severe physical exercise (riding, dancing, etc.) may greatly aggravate the condition. Among other complaints which frequently accompany the affection may be mentioned attacks of nervous pains in the lumbar region or between the ribs, severe headache, disturbances of the stomach and intestine, and especially constipation. A sudden change of position with torsion of the body will cause severe colicky pains in the stomach, accompanied by chills, vomiting, sensations of fear, retention of urine, and, in rare cases, by dropsy of the kidney.

Floating kidney is not a dangerous affection. The annoying symptoms generally subside in a very short time if the kidney can be replaced in its normal position and kept there. When symptoms of incarceration are present, the replacing of the kidney must be undertaken only by a physician. Elastic bandages, corsets, etc., for holding the kidney in position, should always be selected by a specialist, and not by a belt-maker. Very good results are obtained from a course of forced feeding, massage of the kidney, and methodical water-treatment. In severe cases it may be necessary to perform an operation by which the kidney is securely sutured into its proper position.

Inflammation of the Pelvis of the Kidney.—Acute and insidious inflammation of the kidney-pelvis may arise in consequence of the entrance of pathogenic germs, which may reach the kidney through the ureter in gonorrhea or in inflammation of the bladder, or through the introduction of an unclean catheter. A bacterial infection of the kidney-pelvis may be brought about also by means of the blood, if the bacteria (as in typhus, scarlet fever, puerperal fever, or blood-poisoning) reach the kidney through inflammation of the lungs. Other causative factors are suppurative inflammation of the kidneys, and the irritation exercised upon the kidney-pelvis by poisons, or by granules or stones of the kidney.

The attack most frequently begins with a gradually increasing pain on

one side, in the vicinity of the kidney. The urine is cloudy; and upon standing for some time it forms, without becoming clear itself, a yellowish-white deposit which frequently comprises one-third of the total amount of urine. This deposit consists of mucus, pus, and blood. When pus is present in the pelvis of the kidney, there is high fever with chills, nausea, and vomiting. In most cases inflammation of the kidney-pelvis is accompanied by some other affection of the kidney. Except in light cases, the course of the disease is apt to be prolonged, especially when the kidney proper is involved. Nevertheless, the issue is usually favorable; and, except where a considerable formation of pus takes place, the disease does not endanger life. General measures that are helpful in the treatment of this disease include rest in bed, simple food (preferably a milk diet), copious drinks of mineral waters, and lukewarm baths. The special treatment for each individual case must always be left to the physician. An operation is usually necessary.

Renal Colic.—A condition manifesting itself by sudden attacks of violent pain in one side of the abdomen, in the region of the kidney, radiating into the abdomen, the small of the back, and into the bladder and sexual organs. The attack is ushered in by pain, vomiting, violent chills, rise of temperature, and marked difficulty of urination. In spite of an urgent desire to urinate, only a few drops may be passed. Renal colic is accompanied by cold perspiration, spasms, and attacks of fainting. The paroxysm usually persists for several hours, and is followed by a feeling of depression and exhaustion lasting for some time; but in some cases the tormenting condition may be protracted for several days. Single attacks are comparatively rare, recurrences being the rule; but these usually terminate favorably. The disease occurs mostly as a consequence of the formation of gravel or kidney-stones; more rarely as a result of the presence of worms in the pelvis of the kidney. The attack is due to the attempted passage of a stone into the bladder through the ureter. The pain may cease as a result of the successful voyage of a stone, or as a result of its slipping back into the pelvis of the kidney. Other causes of renal colic are the sudden bending or twisting of the ureter in floating kidney, spasm, scar formation in the ureter, compression of the ureter by tumors, displacement of the womb, etc. The attacks of pain require immediate medical attention, but until the physician's arrival considerable relief may be obtained by applying hot compresses to the abdomen and loins, and also by taking warm baths.

Stones, Gravel, and Sand in the Kidneys.—Smaller or larger structures may form in the pelvis of the kidneys or in the ureters, resulting from the deposit of stone-forming masses (salts) around a nucleus which usually consists of mucus, pus, tumor-particles, or coagulated blood. The affection may occur at any time of life. It is, however, most frequent in middle-aged persons, and is usually one-sided. Its course may be without any

disturbances if the deposit is small (sand or gravel) and easily washed out through the urinary passages with the urine. Larger stones, however, often become caught in the ureter, giving rise to renal colic. Irritation of the mucous membrane of the pelvis of the kidney may result in inflammation, suppuration, or ulceration; and complete obstruction of the ureter may lead to dropsy of the kidney. Aside from the extremely characteristic attacks of renal colic, the affection can be readily recognized from the occurrence of sand, gravel, or small stones in the freshly voided urine, which often contains mucus, blood, and pus in addition.

The course of this frequent affection is usually favorable, and becomes of grave import only in cases where suppuration and ulceration take place in the kidneys or in the ureters. If the stones be uric-acid stones, it is necessary, above all, to regulate the diet and to restrict the ingestion of albuminous foods. Irritating foods and alcoholic beverages must be avoided; and vegetable dishes, milk, and farinaceous foods should be preferred. Washing the renal pelvis, and the expulsion or dissolution of the stones, should be accomplished by drinking large quantities of milk, or by taking cures at a spa. In *Europe*, Ems, Wildungen, Salzbrunn, Carlsbad, Marienbad, and Franzensbad are the most popular spas. In the *United States*, Virginia Hot Springs, Frenchlick Springs, Saratoga, and Mt. Clemens may be recommended. The mineral waters of these resorts may be drunk at home. Metabolism must be stimulated by regular activity of the muscles, and by baths and massage. If the condition gives rise to severe consequences, operative removal of the stones may become necessary. It is important to remember that a brick-dust deposit in a cold chamber is not a sign of disease, quack literature to the contrary notwithstanding. Plate XV. shows an X-ray photograph of a stone in the kidney.

KING'S EVIL.—See SCROFULA.

KINO.—The dried juice of an East-Indian tree, the *Pterocarpus marsupium*. It occurs in small, reddish fragments, with a bitter astringent taste. Kino contains kinotannic acid, and its action much resembles that of catechu. The dose of the tincture, which is used as an astringent in dysentery, diarrhea, leucorrhea, etc., is about a teaspoonful.

KLEPTOMANIA.—See MENTAL DISEASES.

KNOCK-KNEE.—A deformity in which the legs form an angle, obtuse outwardly, the apex of which lies in the knee-joint (Fig. 247). The disease is not only a cosmetic defect, but is the source of many difficulties to the possessor. As a rule he can not stand or walk for any length of time, tires easily, and is therefore unfit for many callings. Knock-knees develop in children in consequence of rickets; in young persons they develop from overburdening or overexercising the legs. This is especially the case with young persons whose vocations in life demand long standing, causing fatigue, such as waiters, blacksmiths, bakers, etc.

In the treatment of knock-knees, efforts must be made to remove the cause. If resulting from RICKETS (which see) in small children, this condition can



FIG. 247. Knock-knee.

be treated. If resulting from overburdening of the legs, measures must be taken against the deleterious influence. The developed abnormality may be treated in various ways. In young children a cure may be effected by applying plaster of Paris bandages to the legs after these have been straightened; or by applying splints, gradually effecting a correct position of the legs. Certain forms of knock-knees demand operative interference, either bloodless or otherwise. When the operation is bloodless, the leg is adjusted by breaking the bone by manual strength or by a machine, allowing it to join in the straightened position. In bloody operations, the straightening is achieved by sawing through the bones of leg and thigh, and then bringing the extremities into the correct position.

Young persons whose physical structure and strength are not adequate for the prolonged standing necessary in some callings, ought not to choose the vocations of baker, blacksmith, salesman, waiter, etc.

KRAMERIA (RATANY).—The root of the *Krameria triandra* and the *Krameria ixina*, allied shrubs growing in South America. It occurs in the market in sticks of from one to two feet in length and from one-fourth to one inch in diameter. Krameria is a vegetable astringent containing TANNIC ACID (which see). The tincture is given in doses up to a teaspoonful for its astringent action. It is sometimes made up in troches which are useful for relaxed or congested throat.

KUMISS.—See KEPHIR and KUMISS.

L

LABOR.—See PARTURITION.

LACRIMAL GLAND, SAC, AND DUCT, DISEASES OF.—The lacrimal gland is a small organ which is situated above the outer corner of the eye and which secretes the tears. The lacrimal sac forms the upper, rounded eminence of the lacrimal duct which conveys the tears from the inner corner of the eye to the nose (see pp. 68–69, and Fig. 58). Affections of the lacrimal gland, such as tumors and suppurations, are rare conditions, and are observed only in isolated cases. Diseases of the lacrimal duct are more frequent. An obstruction in this canal causes the tears to stagnate and decompose, as a result of which bacteria may settle and give rise to puru-

lent inflammation of the mucous membrane of the canal. Inflammation of the lacrimal sac results in the destruction of its wall, and in the formation of a fistula. The bacteria are a great menace to the eye. Where there is present a superficial injury of the cornea, bacteria may settle in the wound and give rise to a corneal ulcer which may seriously impair the sight, or even cause total loss of the eye. For these reasons obstructions in the lacrimal ducts should never be neglected, but should at once be removed by a physician.

LACTATION.—See **NURSING**.

LANOLIN (ADEPS LANÆ HYDROSUS).—A yellowish substance, of the consistency of lard, and obtained by purifying the fat contained in sheep's wool. It has no special properties of its own, but, on account of its soothing effect on the skin, it is useful as a basis for salves intended for cutaneous application.

LARYNX.—For anatomy and functions, see **INTRODUCTORY CHAPTERS** (pp. 49-50).

LARYNX, DISEASES OF.—The vocal cords and their surrounding structures are subject to a large number of affections. Exposure to cold, or to the action of irritating gases, may cause simple catarrhal inflammation which may terminate in early recovery or pass into a chronic condition.

The affection is often aggravated by excessive smoking (smoker's sore throat), or by prolonged use of the vocal cords, as in teachers, singers, ministers, etc. New growths may occur on the vocal cords, or they may become the seat of chronic inflammations due to certain micro-organisms, tuberculosis, syphilis, etc. Some of the more common affections of the larynx are here considered.

Catarrh of the Larynx (Laryngitis).—This disease may be either acute or chronic. The acute form may be due to cold and drenching, to affections of the nose and of the windpipe (especially if respiration is carried on habitually through the mouth), to overexertion of the vocal cords, to inhalation of foul and dusty air, etc. Bicyclists are particularly liable to contract this disease from inhaling large quantities of dust. The regular use of strong spices and of alcoholic drinks is a well-known cause of laryngeal catarrh. Some diseases, such as influenza, measles, and whooping-cough, often involve the larynx. Men are more frequently affected than women, owing to the more exposed nature of their occupations. Cases of acute catarrh of the larynx occur with greatest frequency during spring and autumn; more rarely in summer.

Acute laryngitis begins with irritation and dryness of the throat, soon followed by more or less hoarseness. If the voice be not used to excess, and no grave sins committed against the rules of hygiene, the process may pass within a week. Severe forms of the disease, however, may lead to superficial ulcers on the vocal cords, or to thickening of the false vocal cords which

are located over the true ones (see Fig. 51), and may require weeks to be cured. In the dry forms of laryngitis slight hemorrhages may take place. Recovery is delayed by smoking, drinking, dancing, much talking, and singing; it may even be entirely prevented so that a chronic inflammation develops.

A mild catarrh heals spontaneously if properly cared for. In order to assist nature in bringing about recovery it is advisable to remain indoors, to abstain from smoking, to speak as little as possible, to take inhalations of steam, to drink warm mineral waters with or without milk, and to place a cold compress around the neck at night, allowing it to become warm. The tendency to cough should be suppressed by soothing medicines.

In children an acute catarrh of the larynx often manifests itself in the form of a croupy cough. The children "bark" suddenly at night with a hoarse sound, and suffer from the signs of impaired respiration, which sometimes increases almost to suffocation. Such attacks, which may last an hour or two, may recur night after night for one or two weeks in succession. In certain cases, however, a recurrence may not take place until a fresh cold has been contracted. This disease, which constitutes the so-called "false croup," almost invariably terminates in recovery. Hot drinks may be given to loosen the viscid mucus.

Chronic catarrh of the larynx usually develops from the acute form. It is especially frequent in ministers, orators, military officers, minstrels, street venders, stone-cutters, tavern-keepers, and workers in tobacco factories. The disturbances comprise dryness, constant hoarseness, irritation, and hacking or coughing. The degree of hoarseness varies. Sometimes the voice is entirely absent, especially on awakening in the morning, or after severe vocal exertions. If the disease runs a very protracted course it may cause paralysis of the vocal muscles and thickening of the cords.

The course of the affection is the more obstinate the less the patients heed the directions of the physician, or the less they are able to do so on account of their occupations. Acute attacks frequently recur. Above all, special attention should be paid to free breathing through the nose. If the nose be temporarily or constantly obstructed it should be cleared by a physician. The domestic remedies commonly used for the acute form of laryngitis are rarely efficacious in the chronic type of the affection. As a rule local treatment is required; often of the nose and pharynx also.

Dropsy of the Larynx.—This condition may occur in affections of the kidneys, and in purulent inflammation of the throat or of the tonsils. It may lead to death by suffocation unless an opening is made by incision into the windpipe.

Foreign Bodies in the Larynx.—Foreign bodies rarely enter the larynx. Small, rounded objects (as beads, coins, and buttons) usually pass into the windpipe, or remain in the throat. Pointed objects (as fish-bones, pins,

and needles) stick to the sides of the trachea, and may lead to considerable difficulty of breathing. Their removal by a physician is often difficult, although usually possible. By the aid of long tubes it is even feasible to remove foreign bodies from the deeper branches of the windpipe, but as a rule it is necessary to make an opening by incision into the trachea. It is extremely risky to hold pins, nails, or other pointed objects between the lips, as they are very liable to pass into the trachea in consequence of a sudden cough or laugh. Children should be especially cautioned against doing so.

Syphilis of the Larynx.—The earliest symptom of syphilis in the larynx consists in the formation of mucous patches, or in an attack of very persistent catarrh. At a more advanced stage of the disease the formation of gummatous tumors and membranous growths which narrow the laryngeal space is the chief manifestation. The character of the disease can be determined only by aid of the laryngoscope, and the only efficacious treatment is with mercury or iodid. Cases which are not recognized in time, or which are neglected, may lead to very severe narrowing of the laryngeal space, and may make it necessary for the patient to constantly wear a tube in the throat.

Tuberculosis of the Larynx.—This is a disease which is as frequent as it is dreaded. The larynx is rarely the first place at which tuberculosis manifests itself; and involvement of this organ is generally an accompanying symptom of a long-existing pulmonary tuberculosis. The affection occurs as a result of the transmission of the tuberculosis-bacillus through the blood-current; sometimes also by infection through bacillus-containing sputum which may remain in the larynx for some time. Tuberculosis of the larynx affects principally young adults. Advanced age is not exempt, however; and in very rare cases children may be attacked also.

Obstinate hoarseness and, on longer duration, pain during swallowing and impairment of respiration are the manifestations of the disease. These are the results of infiltration in the vocal cords, the smooth borders of which appear corroded owing to tuberculous inflammation of the mucous membrane and cartilages of the larynx. The air-passage is sometimes obstructed by swellings to such an extent that an incision must be made into the windpipe in order to prevent suffocation. In rare cases tuberculosis of the larynx may manifest itself by the formation of a tumor without ulceration. If this be the case the tumor may be operated for like a polypus of the vocal cords.

Tuberculosis of the larynx is usually a chronic disease which may last for years. Lack of proper treatment, bad air, early pains upon swallowing, insufficient nourishment, and a hereditary tendency to tuberculous affections hasten the distressing termination of the malady. The progress of the disease may often be retarded for years by an appropriate mode of living, and by having the larynx treated by a specialist who will cauterize and scrape the affected parts. Complete cures are occasionally, though rarely, effected.

Tumors of the Larynx.—Various morbid growths may form in the larynx, but those of most frequent occurrence are benign in character. *Polypus* of the vocal cords causes permanent hoarseness unaccompanied by pain or any other disturbances. Complete recovery takes place upon the operative removal of the growth, which a practised hand may accomplish easily and painlessly through the mouth. *Singers' nodules* result from overexertion, or from the use of wrong methods in singing. *Warts* frequently appear, also in children. They cause permanent hoarseness, and often respiratory difficulties. *Cancer* is malignant, and can be removed by a surgical operation only when recognized in time.

LAUDANUM.—See OPIUM.

LAUGHTER, CONVULSIVE.—See HYSTERIA.

LAVENDER.—The fresh leaves and tops of the *Lavandula officinalis*, an aromatic shrub of the mint family (*Labiatae*). The oil of lavender is used as a perfume, and as an adjuvant in various remedies and hand lotions. A few drops of the spirit are sometimes given with some simple bitter in cases of indigestion with flatulence.

LEAD-POISONING.—Acute attacks of this form of poisoning sometimes occur as the result of the swallowing of sugar of lead, or of white lead-pigment. As a rule, however, it comes on insidiously, and pursues a chronic course. This is met with in persons who are engaged in handling the metal, or employed in establishments where the various products derived from lead are manufactured. The list includes smelters, lead-pipe workers, type-founders, typesetters, potters and others who employ lead-glazes, artists, painters and lacquerers who make use of the various lead-pigments, and furriers, hatters, and dyers who use lead sulfate for dyeing purposes. Lead-poisoning may be brought about also by eating or drinking from vessels which are incompletely glazed, by using food which has been preserved in cans soldered with lead, by drinking water which has been standing in lead-pipes, by using tea or chocolate which has been packed in lead-foil, by working on clothes which have been dyed with lead-pigments, and by the application of hair-dyes and face-paints which contain lead.

The acute form of lead-poisoning is marked by pains in the lower portion of the abdomen, nausea, vomiting, bloody stools or constipation, vertigo, and unconsciousness. This type often develops into the chronic form, the victims of which become emaciated and weak, with a pale, leaden complexion (Plate XIV., 6). The gums are spongy, and at the dental margin there may be seen a slate-gray line, the so-called "lead-line." Among other symptoms, which may appear together or separately, may be mentioned severe colicky pains accompanied by obstinate constipation, nausea and vomiting, cutting pains in the limbs, temporary blindness, kidney-disease, paralysis (usually of the arms), delirium, and convulsions.

It is only in the acute form of lead-poisoning that the laity can render

any assistance to the patient. This should consist in the production of free vomiting, and in the administration of milk and eggs beaten out in water, and of a solution of Glauber's salt or Epsom salts (1 to 2 tablespoonfuls in a pint of water). For the chronic form of poisoning the physician must be consulted; but the patient should be immediately enjoined to give up the work which is the cause of the trouble. See also the article on OCCUPATION DISEASES.

LEECH.—A blood-sucking aquatic worm used in medicine for the purpose of abstracting blood through the skin. By means of its serrated jaws the leech attaches itself to the skin and sucks up about two or three times its own weight of blood. The part to which a leech is to be applied must be carefully cleansed with soap and water in order to guard against infection. The best method of applying a leech is to place it in a narrow test-tube, the opening of which is thereupon pressed against the skin (see Fig. 248); and the animal may be induced to bite more rapidly if a drop of blood has been secured by first pricking the skin with a needle. As soon as the leech is fully distended, it lets go of its own accord. If it be desired to interrupt the abstraction of blood before this time, a little salt water may be poured over the animal; this also rapidly kills it. The application of warm, moist poultices favors subsequent bleeding from the part to which the leech had been applied. In order to stop the bleeding at the point where the animal had bitten into the skin, a clean compress should be applied.



FIG. 248. Manner of applying a leech.

LEGUMES.—The fruits of various members of the bean family, such as beans, peas, and lentils. Owing to the large amounts of proteids which they contain, legumes have often been called "poor man's meat." They play an important part as popular foodstuffs also on account of the large percentage of carbohydrates which they contain. By adding a sufficient quantity of fat and salt to a dish of legumes, it is quite possible to make it nourishing enough to fill all the requirements of the human body, using a daily consumption of about 18 ounces. It would require this quantity to make up for the loss of strength occurring in the daily work. This large amount, however, can not be readily utilized by the digestive organs. Even in the use of smaller amounts it is essential to remember that of the proteids of legumes twenty per cent. less are utilized than is the case with animal proteids; and even this amount of proteids can be utilized only when the legumes are properly prepared. This preparation includes the removal of the outer coats by sufficient boiling, and the transformation of the legumes into a pap. They are most readily digestible in the form of soups, because the digestive juices can then come in contact with the smallest particles and

render them fit for absorption by the body. Some portions, however, always remain undigested, even when cooked in the most appropriate manner. Nevertheless, the great importance of legumes as foodstuffs is not thereby lessened. Their low cost favors their extensive use; but it should be noted that it is better to eat them frequently in small quantities, than to eat them less often, but in large quantities.

The legumes are thought to derive the nitrogen for the formation of their proteids directly from the air, through the agency of a variety of bacteria which causes the appearance of small bulbs on the roots. Hence soil which is otherwise unsuitable for legumes may be prepared by inoculation.

LEMON.—See LIMONIS.

LEPROSY.—A chronic, constitutional, and infectious disease. In the middle ages it was widely disseminated throughout Europe, but it occurs now only in a few European countries, especially in Sweden, Norway, the Baltic provinces of Russia, and in some of the southern countries. Several decades ago a small focus of leprosy appeared in the district of Memel, in Germany, the disease having been transmitted from the adjacent Courland. In Asia and Africa leprosy is a very wide-spread disease. It is almost unknown in the United States, but is present in the Hawaiian Islands. Leprosy is caused by a micro-organism which in its appearance and properties resembles the tubercle-bacillus. The *bacillus lepræ* is contained especially in the secretions of the ulcers which develop in the skin of the patients, and may be transmitted by infection. Continued intercourse with leprosy persons is quite as dangerous as the use of their household utensils or other objects to which the infectious substance may have adhered. Lack of proper care of the skin, personal uncleanness, and unsanitary dwellings and garments, play a considerable part in the spread of the disease.

Two chief forms of the disease are distinguished: tubercular leprosy and anesthetic leprosy.

Tubercular leprosy is characterized by the development of tubercular nodes in the skin and mucous membranes; especially in the face, and on the knees, elbows, hands, and fingers. These growths, which in the beginning are hard, may gradually soften and break down into suppurating ulcers. The face of the patient is especially disfigured by these ulcerating growths.

In the anesthetic type of leprosy the nerve-trunks are chiefly affected. In this form of the disease macular eruptions develop on the skin. These spots are at first reddish-white, later becoming darker, and are devoid of the sense of touch. This insensibility gradually extends over larger portions of the surface of the body, irrespective of the presence of the maculæ. At the same time there occurs a wasting of the muscles (especially in the face, hands, and feet) which in consequence become paralyzed. The further course of the affection leads to the formation of ulcers. If situated

upon the hands or feet, these ulcers may extend into the deeper layers, where their destructive process may lead to the loss of different joints of the fingers and toes; in rare cases also to considerable mutilations, such as the loss of an entire hand or foot.

These two forms of leprosy can not be strictly differentiated. The symptoms of one frequently combine with those of the other, either in the later course of the disease, or from the very beginning.

The course of leprosy is extremely protracted. It almost invariably causes a long-lasting illness, often persisting for decades, until death takes place in consequence of debility, or by supervening affections of vital internal organs. No positive remedy for leprosy is as yet known. The aims of the physician are therefore restricted to improvement of nutrition, alleviation of the pains, local treatment of the nodes and ulcers, etc. Some patients recover spontaneously.

As leprosy is usually incurable, the main object should be its prevention. This is best accomplished by avoiding all contact with the leprosy; and this, in turn, is most thoroughly achieved by the segregation and colonization of the patients in separate asylums, such as are being established in different countries throughout the world. The disappearance of leprosy from the greater part of Europe is due principally to the fact that the unfortunate patients were treated with inexorable rigor during the middle ages. They were excluded from human society, expelled from the cities, and imprisoned in pest-houses. Naturally, modern hygienic and protective measures have advanced far beyond the cruel customs of medieval times. Coercion is used only for those patients who can not be sufficiently segregated in their own dwellings; and modern leprosy-houses are so organized that they are actual blessings to the patients who previously lived in filth, need, and misery. As a rule they exert also a favorable influence upon the course of the malady. In the early centuries it is probable that the term "leprosy" included many other diseases, notably syphilis and tuberculosis.

LEUCORRHEA.—See VAGINA, DISEASES OF; WOMB, DISEASES OF.

LICE.—Wingless insects parasitic on man. They multiply rapidly, fasten themselves into the skin by biting, and suck the blood from the wound thus inflicted. Of the various species of lice, there are three chief kinds which infest human beings: the head-louse, the body-louse, and the crab-louse.

The head-louse (see Fig. 249) is a six-legged insect about one-twelfth of an inch long, which lives in the hair of the head. Its eggs (*nits*), which are surrounded with a hard skin, are fastened to the hairs (see Fig. 250). The presence of lice in the scalp causes intense itching and scratching which gives rise to the formation of crusts and scabs, causing the hairs to become matted. If the scalp is greatly neglected, the eruption, which gives rise to glandular swellings in the nape of the neck, may spread to

the face. Treatment consists in anointing and rubbing the head with a mixture of equal parts of kerosene and sweet-oil, followed, on the next day, by a thorough scrubbing and washing with soft soap. The nits are removed by continued combing with a fine comb immersed in vinegar. The eruption usually heals spontaneously after removal of the lice; if not, it must be treated by a physician. It is not necessary to have the hair cut.

The body-louse (see Fig. 251) is a larger and quicker insect than the head-louse. It habitates only the body-linen, but it bites into and sucks the blood from the skin. Its traces, consisting in a very much scratched



Female.



Male.

FIG. 249. Head-louse.



FIG. 250. Eggs of head-louse.



FIG. 251. Body-louse.



FIG. 252. Crab-louse.

skin, are found especially where the garments fit snugly; as at the belt, corset, suspenders, collar, etc. In persons who are greatly infested with lice, and who neglect this condition, the skin of the entire body often turns slate-colored to brown, and is interspersed with a number of scarred or bloody stripes, abscesses, and open ulcers. Treatment consists in disinfecting the outer garments and the linen in separate apparatus, or in boiling them in water.

The crab-louse (see Fig. 252) is a gray animal, broader than the head-louse, and lives almost exclusively in the hairs on the pubic region. In cases of extreme carelessness it may spread to the hairs of the other parts of the body (chest, armpits, beard, eyebrows, and eyelashes), but it never

inhabits the hair of the head. It fastens itself so firmly to the skin at the roots of the hairs that it can be removed only with difficulty; and it appears like a blotch on the skin, the size of a pin-head or a millet-seed. The nits are surrounded with a hard covering and are firmly fastened to the hairs. Treatment is the same as for the head-louse,—rubbing with kerosene, and scrubbing with soft soap. Blue ointment, which is often used in these cases, may cause the occurrence of herpes.

Lice are never the result of an internal affection or of a skin-disease; nor do they originate spontaneously in dirt. They are transmitted from one human being to another, and are indicative of dirty and careless habits.

LICORICE.—See GLYCYRRHIZA.

LIGHT.—It is an old and true saying that “where the sun does not enter, the physician does.” This demonstrates the importance of light to health. Light is a great stimulant to the skin, the effect of the sunlight shining upon the body being to increase its tone and stimulating its metabolism. Excessive stimulation is possible, as in the tropics, and may lead to depression of the bodily vigor. Light also acts as a tonic to the red blood-corpuscles. The body’s requirement of oxygen, a main condition of life, is increased by the action of light. Human beings (such as prisoners) who live in darkness become pale and debilitated, and finally fall victims to wasting diseases, particularly to tuberculosis. Just as the plant obtains its green color only from the light, so does the healthy, red blood of man form only through the influence of the sunlight. Sunny, large, and airy dwellings are therefore most important requirements. A large proportion of the population, particularly in the large cities, lives under unhealthy conditions, because of the darkness of the dwellings. Sunlight is a necessity to the healthy as well as to the sick.

Children brought up in dark rooms develop a tendency to become anemic, and are stunted in their physical growth. Dark living-quarters exert a very depressing influence upon the mind, and consequently also upon the body. The eyes are strained and finally ruined. Lack of sufficient light renders it difficult to keep the rooms clean and orderly, and favors the growth of molds whose emanations poison the air. The bacteria which cause many of the contagious diseases retain their vitality for a much longer period in the dark; while an abundance of light (especially sunlight) destroys them very quickly. Dark apartments can rarely be satisfactorily aired because the windows are few; and the rooms consequently become damp. The artificial illumination rendered necessary by these conditions also aids in impoverishing the air of the rooms.

The brightness of a room depends upon the proportion between window-space and floor-space. The windows ought to represent an area of from one-fifth to one-sixth of that of the floor. Another factor which determines the amount of light entering the room is the height of the windows. A

good test consists in observing how much of the sky remains within sight at various distances from the window. Narrow streets and courtyards render the lower stories dark, even if large and high windows are provided, for the houses on the opposite side cut off a large part of the light. Various remedies have been suggested for the purpose of overcoming this difficulty, among which may be mentioned whitewashing the opposite walls, the use of light-colored wall-papers, the application of light-reflecting devices inside or outside the windows, and the installation of large mirrors in the rear of the rooms, facing the windows. Large trees cut off a good deal of light from the house, especially in summer. Heavy window-curtains had best be avoided, or else arranged in such a manner that the upper parts of the windows, through which the greatest amount of light enters, are left uncovered. For the purpose of tempering a strong light or the summer sun, grayish or yellowish window-shades made of cotton or linen may be employed.

When selecting a dwelling, attention should always be given to the weather on the particular day when the inspection is being made; and the doors should be closed as under ordinary circumstances, so that a correct impression may be obtained as to the brightness of the rooms. The location of the rooms should also be considered. Rooms facing north do not receive any sunlight, and comparatively little daylight. Rooms facing south are most favorably situated, receiving strong sunlight during spring and fall, but only morning and late afternoon sun during the hot summer months. Rooms with western exposure are hot, but are better lighted than northerly rooms, provided of course that there are no walls or other objects to obstruct the light. The same may be said of rooms with eastern exposure. Writing-desks should be placed close to the windows so that they are lighted from in front or from the left-hand side. When the source of illumination is on the right side of the desk, the shadow of the writer's hand is thrown on the paper. Daylight must be regarded as inadequate whenever it becomes necessary to bring ordinary print close to the eyes in order to decipher it, or when the eyes readily become tired.

Artificial illumination can not displace daylight, and should be used only when necessary. A mixture of the two should be avoided as it affects the eyes. The requirements for artificial illumination are: cheapness, strength, a color resembling that of ordinary daylight, regularity, and softness. In addition to these the light must not vitiate the air of the room, nor overheat it. Some of these requirements are most completely met by the incandescent electric lamp with a frosted globe. Its use is, however, attended with considerable expense. Next to this in value comes the incandescent gas-light, in which a mantle of incombustible mineral material is brought to a white heat by the burning gas. Ordinary gas-burners, although they consume a greater quantity of gas, give less light and more heat, and also give

off a larger quantity of carbonic acid gas. Good kerosene-lamps give sufficient light for reading within a radius of three feet. The lamp-shade reflects the light to the surface of the table, and protects the reader's eyes against the direct rays. In the course of an hour an ordinary kerosene-lamp gives off about four times as much carbonic acid gas, and two and a half times as much heat, as a full-grown adult. The light of the spirit-lamp is similar in quality to that of the incandescent gas-flame, and may be safely recommended as used in the new types of lamps. It is no more expensive than kerosene. Candles burn with too unsteady a flame, and give too little light for ordinary purposes.

Kerosene as ordinarily marketed for illuminating purposes has very little tendency to catch fire. Explosions are usually due to the careless use of this fluid for lighting fires. Illuminating-gas is very poisonous; when inhaled it exerts an action similar to that of coal-gas, and is rapidly fatal. It explodes very readily when mixed with about ten parts of air. Rooms in which the presence of gas is evident from its characteristic odor should never be entered with an open flame; but the windows should be opened as quickly as possible, the main service pipe shut off, and then the source of the escape sought for and remedied.

LIGHT-BATH, ELECTRIC.—Distinction is to be made between two forms of electric-light baths,—that in which incandescent light is used, and that in which arc-lamps are employed. The latter serves principally for local radiation. Both forms of lamps are usually attached to the same apparatus, to be used according to choice. The apparatus used for the application of electric light is constructed in the form of a box, in which the patient either lies prone or sits in a chair (see Fig. 253). The patient's head remains outside the box, and the opening for the neck may be closed by the use of cloths. The inner walls of the box are covered with mirrors, and are provided with rows of electric lights (40, 60, or more), some or all of which may be connected with the current as de-



FIG. 253. Electric-light-bath apparatus (open).

sired. A thermometer registers the temperature in the box, which usually should be about 113° F. Temperatures exceeding 140° F. should always be avoided. The duration of a bath should be from ten to twenty minutes; rarely longer. By warming the box before the patient enters it, perspiration will set in sooner. A cold compress to the head is advisable. As for the conditions best treated by these baths the advice of the family physician is needed.

LIGHTNING STROKE.—Persons struck by lightning are usually killed instantly. In some cases there are no external evidences of injury on the



FIG. 254. Branched markings on person killed by lightning.

victim's body; in other instances there may be slight abrasions, singed hair, holes in the skin, small sloughs covered with scabs, and more or less extensive burns. Characteristic "lightning marks" are seen quite often, and consist of branching striæ, red or reddish-brown in color, which apparently indicate the path of the electric current (see Fig. 254). These marks usually disappear within a few days. Some victims of lightning strokes have been thrown bodily several yards, and severely injured by the fall.

If the stricken person be not killed outright, he is usually rendered unconscious and has a weak pulse, shallow respiration, cold skin, and a pale face. The prognosis for a complete cure is nevertheless favorable. After a longer or shorter period the injured person may recover from his coma without having been seriously injured; but as a rule partial paralysis, loss of speech, hyperesthesia or anesthesia of the skin, and various neurotic pains are the resultant disturbances. These, however, usually disappear under appropriate treatment.

The first aid to a person injured by lightning should consist in loosening all tight garments, sprinkling the face with cold water, keeping the head low, rubbing the body, and applying smelling-salts to the nostrils. Enemas of vinegar or salt water should also be administered. If the person be able to swallow, a small quantity of an alcoholic stimulant, or Hoffmann's anodyne, may be given on a lump of sugar or in a little water. When the accident has taken place in a closed room, this should at once be thoroughly ventilated, or the patient brought into the open air. Other remedial measures must be applied by the physician who should be called at the earliest opportunity.

In order to avoid the danger of being struck by lightning, it is well to observe certain precautions. One should not cross an open field during a thunder-storm, nor seek shelter under tall, isolated trees. Telephone- and

telegraph-poles should likewise be avoided. If caught in an open field, it is advisable to sit or lie down. In a room one should keep away from large metallic objects, such as chandeliers, and avoid using the telephone. Windows may be kept open, provided there is no draft. The greatest danger when a bolt of lightning finds its way into a closed room is that of suffocation. The popular method of covering an injured person with clay, or burying him in earth, is a useless procedure.

LIGHT-TREATMENT.—The treatment of disease by means of electric light was introduced by Nils Finsen, a Danish physician, who discovered that the ultraviolet rays cause redness and darkening of the skin, and are capable of destroying bacteria. Incandescent-light baths, used for the purpose of inducing sweating, do not belong in this category. Treatment by electric light has been most successful in lupus and in a few diseases of the skin. In carrying on the treatment the light from an arc-lamp is focussed by means of a quartz-lens, being cooled by passing through water, and is then directed to the affected portion of the skin which has previously been rendered bloodless. The healthy skin must be protected from the light. If the treatment be continued long enough, the lupus nodes will disappear, leaving only a non-disfiguring scar. The method has recently been improved by the construction of special lamps in which the electrodes are made from iron instead of from coal, thus furnishing a very bright and cold light, with high bactericidal power. Applications with this lamp (see Fig. 255) require much less time.



FIG. 255. Electric lamp for light-treatment

Red light has a certain action on the skin (seen, for instance, in eruptive diseases, such as smallpox, measles, etc.), but has not yet been thoroughly investigated. The entire system of light-treatment is still in its stage of development, but that has not prevented its being utilized by quacks. The application of this treatment by inexperienced laymen will not fail to result in injurious after-effects. The public should not allow itself to be entrapped by the advertisements of these non-professional "light-healers." Fig. 256 shows the Finsen treatment with the utilization of sunlight.

LIME, CHLORINATED (CALX CHLORATA).—A white, or grayish, granulated powder, with a strong penetrating odor, and a repulsive salty

taste. It is obtained by the action of chlorin on slaked lime, and is usually misnamed "chlorid of lime." It contains about 35 per cent. of chlorin-gas, which is a very active germicide, and is extensively used as a destroyer of putrefactive bacteria. See ANTISEPTIC.

Chlorinated lime is employed also in medicine, both externally and internally. Externally it has been used, in solution, as an application to putrid ulcers and skin eruptions, especially the itch. Internally it has

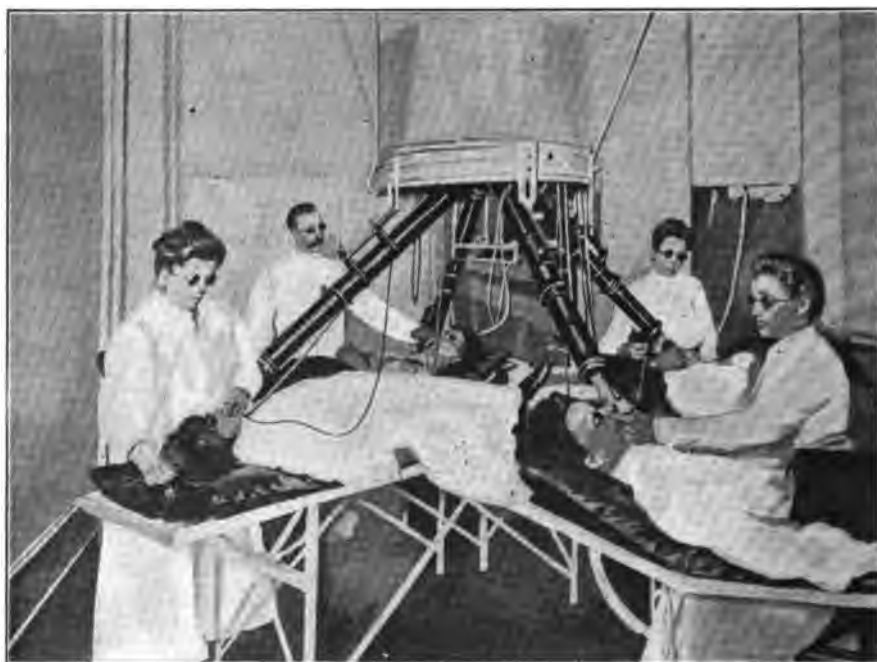


FIG. 256. The Finsen treatment, with utilization of sunlight.

occasionally been employed in dysentery, typhus, etc., the dose for this purpose being from 2 to 5 grains, given in sweetened water.

LIME-WATER (LIQUOR CALCIS).—A saturated watery solution of lime (calcium hydrate). It is a colorless and odorless liquid, having a salty taste. Lime-water is used as an antacid in various gastric and intestinal disturbances which are accompanied with hyperacidity of the gastric juice; and it is an excellent remedy for nausea due to excessive irritation of the stomach. Externally, it is employed as a wash in certain eruptive skin diseases. Owing to its astringent properties, it is of use also in vaginal injections. The dose of lime-water is one or two wineglassfuls several times a day. Its long-continued use is not advisable.

LIMONIS (LEMON).—The fruit of a tropical tree, *Citrus limonum*, of the orange family (*Aurantiaceæ*). It is from two to four inches in length, of a bright yellow color, and has a thick rind. The most important

constituent of the pulp is CITRIC ACID (which see), while the rind yields an oil which is largely used for flavoring purposes.

LIMPING.—A halting gait may be due to various causes, and may be a symptom of more or less importance. It may be due to painful affections in the foot or in the leg; or it may be indicative of a difference in the length of the legs. After a fracture of a bone of the leg, for instance, the injured limb may heal with shortening, thus giving rise to a limping walk. The most important causes of limping are inflammations of joints, such as the hip-joint, the knee-joint, or the joints of the foot. An injury to a joint may likewise produce limping when the joint loses some of its normal movability. In one-sided congenital dislocations of the HIP-JOINT (which see), limping is present in consequence of the deformity. It may be caused also by paralysis of the muscles of the leg. Only a physician is able to determine the cause of the affection, and to give treatment accordingly.

LINIMENTS.—Oily or soapy liquids which are used externally for rubbing into a part. They may contain stimulating elements, like chloroform or turpentine, which act as counter-irritants, or local anesthetics like belladonna or aconite; or they may contain principles which are absorbed and act on the body, such as the oil of wintergreen. In most cases, however, the benefit derived is largely due to the massage which is administered in applying the liniment. Sprains and bruises, old fractures, muscular rheumatism, sciatica and lumbago are often greatly improved by the use of suitable liniments. There are innumerable formulas for such preparations, the basis for most of them being soap liniment. Some of the better known liniments contain chloroform, belladonna, camphor, and turpentine.

LINSEED.—See FLAXSEED.

LIPS, CANCER OF.—Cancerous tumors develop comparatively often in men of advanced age. They usually appear on the lower lip—rarely on the upper one—and generally on parts which have been exposed to continued pressure, as by a pipe. One of the first signs is the development of a small sore on the skin edge of the lip, at times resembling a fever-sore. This persists for years, gradually spreading and increasing in size. The center of the ulcer is depressed, whereas the edges are considerably thickened or swollen from inflammation (see Fig. 257). The growth of the cancer is slow, but steadily progressive. In its more advanced stages it affects the lymph-glands of the lower jaw and of the throat. The only successful treatment consists in the operative removal of the affected portions of the lip; but if the cancer has proliferated into the surrounding parts, and if the lymph-glands of throat and jaw have become swollen, the prospects of a permanent cure are not absolutely certain. Early treatment is, therefore, to be most urgently advised; and any obstinate “fever-sore” on the lips should be seen by a competent physician.

LIQUORS.—A collective term for alcoholic beverages, such as whisky, brandy, gin, etc. Under this name may be included also the so-called "cordials" which form one of the favorite adjuncts of ladies' coffee. Most women would resent the idea that these cordials are neither more nor less than alcoholic beverages; yet such is the case. They are merely distinguished from other liquors by their spicy taste, and by the large amount of sugar which they contain. The celebrated products of the Carthusian and Benedictine monks may likewise be included in this category, although they are somewhat purer than the mixtures ordinarily marketed under the



FIG. 257. Cancerous ulcer on the lower lip.

designations of rose-cordials, vanilla-cordials, etc. Some cordials which are claimed to represent especially fine aromatic products are sold as "cremes."

Alcoholic beverages constitute one of the greatest enemies of mankind (see **ALCOHOLISM**). If it be found necessary to employ liquor, a pure kind without any addition of sugar should be preferred. One of the best of these is *cognac*, which is prepared from grapes, and takes its name from a city in France. Brandies are prepared also from various fruits, such as cherries, blackberries, prunes, etc. Whisky is a liquor usually prepared from rye. Brandy made from potatoes may be counted as about the poorest alcoholic product in the market.

Intoxicating liquors may be manufactured from almost any kind of grain or stone-fruit, as well as from potatoes, the taste of the product depending upon the material used in its manufacture. The true color of these products is that of clear water, and the yellow tinge which they have when marketed is supposed to be derived from the wood of the casks in which they are stored until mature. Continued storage for several years is necessary for most brandies and whiskies, as by this means a "bouquet" is secured, some of the alcohol evaporates, and the product acquires a much milder taste.

LISP.—See SPEECH DISTURBANCES.

LITHIUM.—A metallic, silvery-white element, of a consistency somewhat softer than lead. Because of the fact that in the laboratory lithium shows a marked affinity for uric acid, it has acquired a reputation in gout and other disorders supposed to be due to an excess of uric acid in the system. It is often given freely in the hope of dissolving a stone in the bladder. As a matter of fact it has no effect whatever, neither on stones nor on uric acid in the body. The good effects which follow its use are probably due to the large amount of water in which it is given; and it will probably be prescribed just as long as people will neglect to take the needed amount of water unless it contains some medicine. The citrate and carbonate are slightly diuretic, and are useful in rendering an irritating acid urine alkaline. Lithium bromid, benzoate, and salicylate act as do the other salts of those acids; but they are all irritating and may cause nausea and diarrhea.

LIVER.—For structure and functions, see INTRODUCTORY CHAPTERS (p. 58).

LIVER, DISEASES OF.—The liver is a very much abused organ. In the minds of most people the liver is always at fault; while as a matter of fact the liver is one of the most accommodating organs of the body. It is rarely sick, and usually made so only by gross disregard of the ordinary rules of hygiene. The greater number of troubles ascribed to the liver are more often due to gastro-intestinal disturbances which, by involving the excretory ducts of the liver, cause symptoms of disease in that organ. In many tropical countries, however, parasites often cause severe liver-diseases. Only the more common liver affections are discussed here.

Abscess of the Liver.—This affection occurs very rarely in temperate countries, being more frequently met with in the tropics where it usually accompanies another disease. In exceptional cases an abscess of the liver may form as the direct result of an injury, such as a blow or a fall. The symptoms of liver abscess are very obscure, and in many cases its presence may not become evident until it causes perforation of the skin or inflammation of adjacent organs in the chest or in the abdomen. Even the most experienced physician is at times unable to recognize the disease. Treatment consists in operation at the earliest possible moment.

Atrophy of the Liver.—The disease known as “acute yellow atrophy of the liver” is an affection which, by fatty degeneration, by disintegration, and by rapid atrophy of the liver-cells, quickly leads to a diminution in the size of the organ. The malady, which is very rare, principally affects

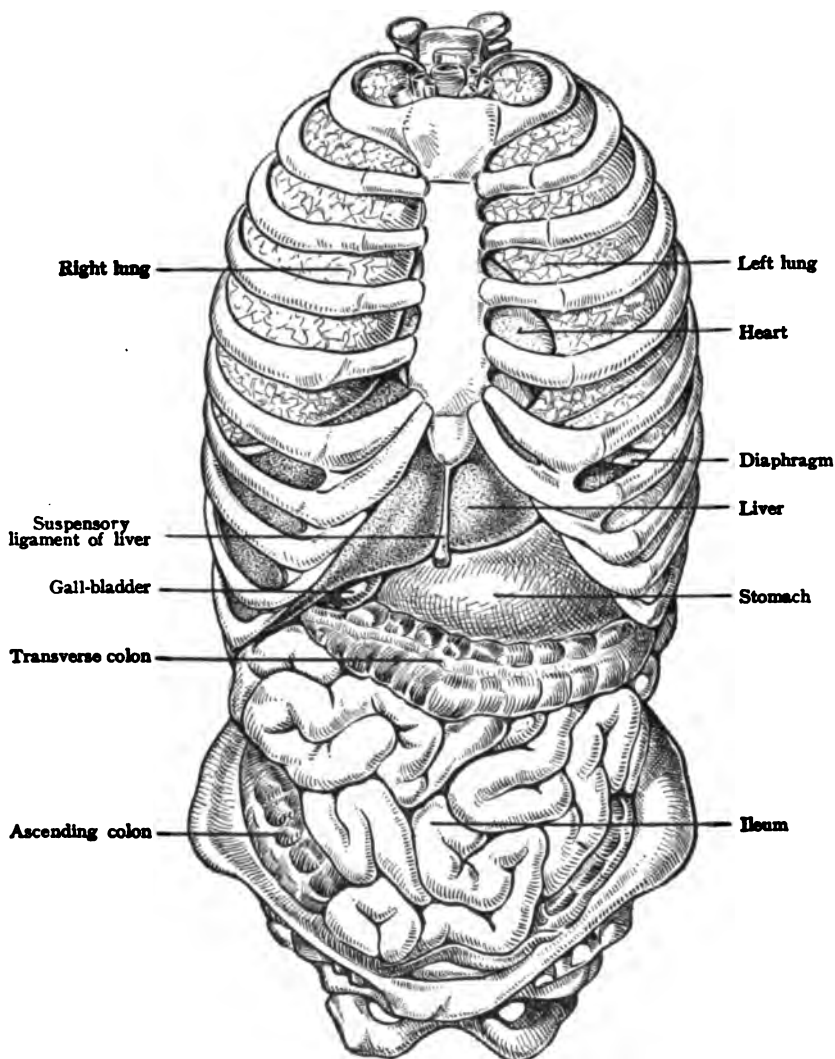


FIG. 258. Diagram showing position of the liver in relation to other organs.

pregnant women. It begins with jaundice and with disturbances of the stomach and intestine. After a longer or shorter interval the brain and nervous system become involved, giving rise to severe symptoms of delirium, convulsions, and periods of coma, which almost invariably lead to a fatal termination. It is one of the most feared complications of pregnancy.

Acute yellow atrophy is a condition which results also from acute phosphorus-poisoning, and to an analogous degree from arsenic-poisoning.

Cancer of the Liver.—This affection occurs most frequently between the fortieth and sixtieth years of life. Heredity, climatic influences, injuries, and gall-stones are thought to be among the causative factors of this condition, but the true origin of cancer is not yet known. Cancer of the liver usually occurs as a secondary disease following cancerous affections of other organs. It is often a very insidious disease, and may give rise to no symptoms until well advanced. There may be violent pains in the region of the liver, radiating into the small of the back or even into the arms, and jaundice usually develops. As a matter of fact, jaundice is one of the earliest symptoms, and a persistent attack of this affection should always be looked upon with suspicion, as being a possible indication of cancer of the liver.

Patients afflicted with cancer of the liver become emaciated, and their skin becomes dry and thin, and assumes a grayish or pale yellow color. Many patients complain of persistent sleeplessness, constant itching of the skin, loss of appetite, great thirst, difficulty in swallowing, etc. The disease is a very grave one, in which the physician is able only to alleviate the most annoying disturbances. Cancer of the liver is of very rare occurrence in tropical climates.

Cirrhosis of the Liver.—A chronic inflammatory disease characterized by morbid formation of connective tissue with subsequent atrophy of the liver-cells. The most frequent, almost the only, cause of this affection is the excessive use of alcoholic drinks. The stronger the alcoholic drink imbibed, and the less solid food eaten with it, the more frequent is the occurrence of this condition, which is essentially a drunkards' disease. Since men are by far more often addicted to drink, the "alcoholic liver" is found more frequently in them than in women. It occasionally occurs in children.

The course of the disease is a chronic one. Its first symptoms are usually concealed by those of a persistent catarrh of the stomach, or of the intestine. It is recognized with certainty principally when the liver shows changes in size. The liver is first enlarged, and then (as a rule) diminished in size. Abdominal dropsy occurring in the course of this disease is usually one of the symptoms which cause the patient to consult a physician. Jaundice, but more often a sallow or pasty complexion, is a subsequent condition. Still later other symptoms set in; such as marked general emaciation, dropsy in the legs, and dilatation of the veins of the skin (blue veins), especially in the neighborhood of the navel.

The essential part of the treatment is early abstinence from alcoholic drinks, which alone renders recovery possible, although not certain. Otherwise, death occurs either from general exhaustion, or in consequence of gastric or intestinal hemorrhages, paralysis of the heart, etc. Patients

usually consult a physician so late that it is possible only to alleviate or cure the more dangerous symptoms; this, however, is at least conducive to prolonging life.

During the term of treatment the diet should consist of easily digestible, non-irritating foods, such as milk, eggs, soup, fish, lean meat, fruits, and easily digestible vegetables. The waters of certain medicinal spas (in *Europe*: Carlsbad, and Kissingen; in the *United States*: Hot Springs, Va., Saratoga Springs, N. Y., and Hot Springs, Ark.) are often beneficial to patients suffering with cirrhosis of the liver. In cases where the disease is so far advanced that it is hopeless, the physician can not always strictly prohibit the use of alcoholic stimulants. If abdominal dropsy be present, the water must be tapped from time to time by means of abdominal puncture. This affords great relief to the patients. Within recent years surgical operations have been devised, which have for their object the relief of abdominal dropsy in cirrhosis. The observations on their results have not yet been sufficient to justify any definite general conclusions.

Echinococcus of the Liver.—The human liver may become infested with the larvæ of the *Tænia echinococcus*, a small tapeworm of the dog (see Fig. 259). These larvæ occur in a compound state, as round cysts, or

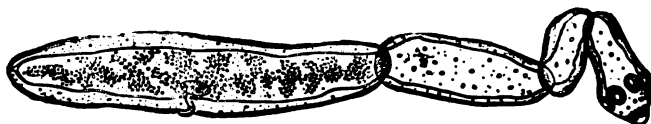


FIG. 259. Echinococcus of the dog (natural size below).

brood-capsules, which may reach the size of a man's head. If the tapeworm eggs discharged from a dog get into the human body, the latter may acquire the echinococcus. Hence the disease principally prevails where dogs are raised under uncleanly conditions. A person who caresses his dog, or allows it to lick his face, exposes himself to this danger. Dogs, as is well known, are in the habit of cleaning their anus by licking it, thus causing the eggs of the tapeworm to be deposited on the tongue. The disease is fortunately rare in the United States, although it is becoming more prevalent of late.

The liver is the favorite seat of the echinococcus, and infection of this organ causes it to increase greatly in size. This in turn causes compression of the right lung, upward pressure upon the heart, and severe dyspnœa. The cysts sometimes perforate into adjacent parts of the body, such as the pericardium or the pleura. They may also empty into the lungs, and the contents be coughed up. If perforation take place into the stomach or into the intestine, the contents are vomited, or discharged with the stools.

The only practical treatment for this disease is by operation. It is often difficult, however, to recognize the affection. It should be borne in

mind that prevention is easier than cure, and that proper precautions will generally suffice to eliminate the danger of infection. The echinococcus of cows, sheep, and other animals, may be discharged with their excrements, and then be eaten by dogs. Strict cleanliness should, therefore, be observed by all those who come in contact with these animals.

Fatty Degeneration of the Liver.—As a rule this disease is a result of errors in diet. It occurs in persons who eat too much starchy food and sugar, and who drink excessive quantities of alcoholic beverages, without taking sufficient muscular exercise. In addition to fatty degeneration of the liver, these patients show signs of general obesity. The disease may affect also those who are debilitated by loss of blood, and those who suffer from chronic diseases of the lungs. It occurs to a very marked degree in cases of poisoning with phosphorus, arsenic, etc.

Fatty degeneration of the liver may be present without causing any symptoms; but as a rule the patients complain of a feeling of tension or of pain in the region of the liver, loss of appetite, eructation, vomiting, and inclination to diarrhea. The stools are sometimes very pale in color owing to their small contents of bile. The disease is not in itself fatal; but the resultant disturbances of digestion and of metabolism, in the presence of a serious acute affection, may hasten the unfavorable termination.

Syphilis of the Liver.—The liver is a frequent seat of syphilitic infection. The disease runs a very protracted course, and bears a direct relation to the causative affection. Upon the cure or non-cure of the original malady depends the termination of the local condition. The symptoms may be like those of abscess of the liver, or of chronic cirrhosis.

LIVER-FLUKE.—See WORMS.

LIVER-SPOTS.—Yellowish, brown, or black patches on the skin. They are generally rounded, moderately raised, and sharply defined from the surrounding skin. Liver-spots have nothing in common with the liver, other than a remote similarity of color. Sometimes congenital, they often develop in great numbers in consequence of pregnancy, and disappear spontaneously. They may arise also in the course of debilitating diseases, such as cancer, or tuberculosis. If the spots appear in large numbers and are of a bluish-black color, with severe general symptoms, they may represent malignant tumors. Since the latter occasionally develop from simple spots, their removal by a slight and painless operation should not be neglected. Local treatment of the condition consists in touching the spots for several hours with a solution of corrosive sublimate. This is often followed by scaling off of the skin, leaving the parts colorless. The spots are apt to recur, however.

LOBELIA.—The leaves and top of the Indian tobacco or *Lobelia inflata*, a common plant of the United States. The active principle is *lobelin*, an alkaloid of somewhat uncertain action. An overdose causes vomiting,

prostration with feeble pulse, cold and clammy skin, and perhaps convulsions and death from respiratory failure. The only use for lobelia internally is in asthma of a nervous origin; and it is not an entirely safe drug in that condition, although sometimes productive of good results. The infusion is sometimes used as an application in ivy-poisoning. The dose of the tincture is from ten to thirty drops.

LOCOMOTOR ATAXIA.—The principal symptom of a wasting disease of the spinal cord. See **TABES DORSALIS**.

LUMBAGO.—Pain in the small of the back. This is not an independent affection, but a symptom which may be due to a variety of diseases. It occurs in inflammatory diseases of bones, in tumor formation in the vertebral bodies, in affections of the rectum (cancer), in diseases of the female sexual organs, in muscular rheumatism, in sciatica, at the onset of infectious diseases (very early and very violent in smallpox), in diseases of the nerves and of the spinal cord, and after injuries. This long list may serve as a warning against continued self-treatment with popular ointments and plasters. Pain in the small of the back is often believed to be nothing but rheumatic pain. But inasmuch as such a pain may be due to a malignant disease which is curable only by prompt treatment, it is necessary as early as possible to undergo an examination by a physician. In women lumbago is often due to abdominal affections. This condition can not be relieved by domestic remedies, but requires removal of the causative affection. If due to posterior displacement of the womb, for instance, the disturbance will disappear as soon as that organ is replaced into its proper position.

LUNACY.—See **IMBECILITY; INSANITY; MENTAL DISEASES**.

LUNAR CAUSTIC.—See **NITRATE OF SILVER**.

LUNGS.—For structure and functions see **INTRODUCTORY CHAPTERS** (pp. 51-53).

LUNGS, DISEASES OF.—The lungs being complex organs it is evident that they are subject to complex diseases. At least three structures of the lung should be considered: (1) the outer serous layer, the *pleura*; (2) the internal framework, the *bronchi*; and (3) the parenchyma of the lung itself, the *breathing spaces*. It rarely happens that any one part of the lung can be affected without some other structure being involved. Pneumonia, for instance, involves not only the parenchyma, but the bronchi and pleura as well. In pulmonary tuberculosis (consumption) all three structures are likewise involved. In pleurisy it is usual to have only the pleura diseased, although the parenchyma of the lung just beneath the pleura is probably also involved; and in bronchitis, which principally involves the bronchi, the adjacent lung-tissue is also somewhat affected. Only the more common lung-troubles are considered under this heading, other diseases of these organs being discussed under their alphabetical arrangement. See **BRONCHITIS; PLEURISY; TUBERCULOSIS OF THE LUNGS**.

Dropsy of the Lungs.—A condition of the lungs, in which the pulmonary tissue as well as the pulmonary vesicles are saturated with serum which comes from the blood. It is known also as pulmonary edema, or “filling up” of the lungs, and is always a serious secondary affection. It occurs as a temporary state in rare cases of heart-defects and chronic affections of the kid-

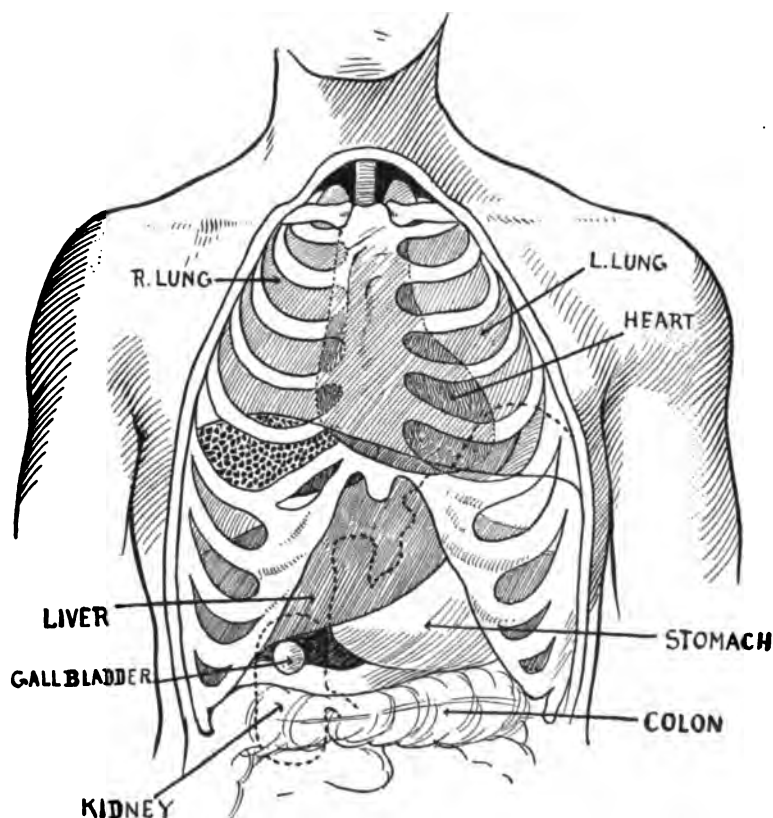


FIG. 260. Diagram showing the lungs in relation to other organs.

neys. Usually it is a sign of approaching death, and is due to defective circulation.

The most characteristic symptom of this severe disturbance of the circulation of the blood is marked shortness of breath. Breathing is very rapid, very labored, and there is rattling in the chest. The skin and the visible mucous membranes are bluish in color, and the patients are usually forced to sit erect in bed and to exert all the auxiliary respiratory muscles in order to pump air enough into the lungs to keep them alive. The sputum, which is usually very profuse at the beginning of an attack, becomes arrested as soon as the respiratory muscles relax, and remains in the air-passages, thus still further increasing the danger of suffocation. If the

body becomes excessively charged with carbonic acid gas, unconsciousness will set in from which the patient can not be aroused. As already stated, dropsy of the lungs is not a disease of itself, but a terminal stage of many severe affections.

Emphysema of the Lungs.—An affection in which the pulmonary vesicles lose their natural elasticity, so that they become unable to contract on expiration, and as a result remain more or less permanently dilated. A moderate degree of this condition is often observed in elderly people as the natural consequence of the gradual weakening of the lung-tissues. Emphysema is found also in younger persons, without being attributable to any known injury. In these cases there is usually present a congenital weakness of the lung-tissue. As a rule, however, the affection can be traced to certain pernicious influences, among which overexertion is one of the most important. Hence the disease is found most frequently in glass-blowers, among players of wind-instruments, in workmen who perform hard bodily work which causes acceleration of respiration and increase of air-pressure during expiration, and in athletes who run too much. Severe whooping-cough, persistent bronchial catarrhs, asthma, and certain heart-diseases may also cause the development of emphysema.

The symptoms of emphysema are fairly well marked. If the distention be slight, only mild disturbances of respiration may be present, particularly if the patient keeps quiet. Cough, expectoration, and oppression of the chest become more marked after bodily exertion, or when a bronchial catarrh (which usually is present) becomes aggravated. Unfavorable weather increases the respiratory disturbances. As the disease progresses and the dilatations become more pronounced, the difficulty in breathing becomes more marked; and the patients are forced to make considerable exertion, especially to force the air out of the lungs. A further consequence of the obstruction to respiration is an impairment of the interchange of gases, and the resultant overcharge of the blood with carbon dioxid. This is manifested by a bluish discoloration of the skin and mucous membranes. In the further course of the disease the heart also becomes implicated. The right half of the heart, by performing an increased amount of labor, endeavors to remove the congestion of the blood in the lungs, caused by destruction of many of the finest pulmonary blood-vessels; and it therefore becomes dilated. If, at length, the power of the heart relaxes, the congestion in the veins of the body becomes greater, and watery extravasations occur under the skin and in the thoracic and abdominal cavities, directly endangering the life of the patient.

It is often possible to recognize the affection from an inspection of the upper part of the body. The neck is usually short and thick; the muscles situated in front and on the sides of the throat (especially those that support the head) are greatly strained and thickened; the veins of the throat

are dilated and stand out distinctly as bluish cords; the thorax is comparatively short, but conspicuously broad and deep (see Plate XVII. 3); inspiration is short and labored, and expiration prolonged.

The duration of the disease, as well as the severity of the disturbances, are subject to great fluctuations, and depend essentially upon whether the patient is able to take proper care of himself, or whether he is compelled to constantly expose himself to further harmful influences. But even at best the prospects of complete recovery are only slight; and physician as well as patient must regard it as a great success if the progress of the disease can be arrested. All measures must be directed toward overcoming the conditions which are known to aggravate the affection. The patient should refrain as much as possible from all kinds of bodily labor, as well as from dancing, singing, shouting, and the playing of wind-instruments. He should avoid overburdening his stomach, and see to it that the bowels are evacuated every day. If the patient's financial condition permit it, he should live in a mild climate during the inclement seasons; this will also facilitate the improvement or cure of a bronchial catarrh which may be present.

In the treatment of emphysema it is necessary, in addition to the employment of remedies which act less upon the disease process than upon the various resultant disturbances, to consider all those measures which mechanically facilitate expiration and possibly improve also the expansibility of the pulmonary tissue. For instance, a friend of the patient, or the patient himself, should place both hands flat over the side of the chest and exert pressure during expiration. This measure must be repeated from five to ten minutes daily for several weeks. The so-called pneumatic treatment has found wide application in the struggle against emphysema. Special forms of apparatus are widely employed. If a catarrh of the finer ramifications of the bronchi be present, inhalation of compressed air, such as is employed in pneumatic cabinets, is advisable.

Gangrene of the Lungs.—Putrefactive bacteria, which enter the lungs and remain there, cause portions of the pulmonary tissue to die and to decompose. These bacteria occasionally reach the lungs through the blood-current, as, for instance, in puerperal fever and inflammation of bones. More often they are introduced through the air-passages, or they spread from putrid areas into adjacent parts.

The most frequent causes of pulmonary gangrene are foreign bodies, especially food remnants, which may enter the lungs by getting into the windpipe instead of into the esophagus, or by suction. This entrance may occur during vomiting, particularly in patients who are unconscious or insane, or who suffer from paralysis of the muscles of swallowing. Gangrene of the lungs sometimes results from other severe affections of these organs, such as pneumonia, or suppurative catarrh of the bronchi.

The disease is either chronic or subacute. Fever is almost invariably present. Most patients have cough, stitching pains in the sides, and shortness of breath. But neither these signs nor an examination of the lungs are sufficient to determine with certainty the true nature of the affection. In most cases a positive diagnosis may be arrived at by a microscopical and general study of the sputum. The sputum is characterized by its repulsively pungent and putrid odor which rapidly permeates the air in the neighborhood of the patient, rendering it almost impossible to approach him. The same applies to the breath and to the cough. The sputum is rather profuse, and soon after being expectorated it separates into layers: an upper layer which is mucopurulent and covered with froth; a middle layer which is more watery; and a lower layer which is almost entirely purulent, smeary, and yellowish-green. The lower layer also contains smaller or larger malodorous plugs which are especially characteristic of pulmonary gangrene.

When only a circumscribed gangrenous area (a patch of gangrene) is present, recovery is not impossible; but the disease is always a very protracted one, lasting for months or years. The stronger and younger the patient, and the smaller the diseased area, the more hopeful the outlook.

In order to prevent the disease, great care should be taken when feeding unconscious patients; and those who suffer from disturbances of swallowing should be carefully watched. If necessary, artificial feeding with a throat catheter should be resorted to. Children should be taught not to take foreign bodies into their mouths. They, as well as grown persons, should accustom themselves to eat slowly and without talking. The medical treatment includes a careful dietary and a judicious use of antiseptics, which only the physician can determine.

Pneumonia.—Inflammation of the lungs; a disease which is characterized by a comparatively regular course. It usually develops at a time when the patient is in the best of health, progresses very acutely to a crisis, and ends abruptly either in recovery or in death. The individual attacked is suddenly affected by a violent chill which is followed by a sudden rise in temperature. After a few hours the patient usually suffers from acute pains in the affected side of the chest; his face becomes flushed, and he develops a short, painful cough, superficial breathing, and a severe feeling of oppression. The sputum, owing to a slight admixture of blood, very soon gets a rusty appearance. This bloody sputum is peculiar to many forms of inflammation of the lungs, and is not necessarily a bad prognostic sign. The lips often show an eruption of blisters. During the further course of the disease the shortness of breath and the oppressive sensation become worse, the cough grows more violent and painful, and if respiration is labored the face may become somewhat bluish. The patient seems to grow sicker and sicker until the crisis appears. This occurs between the fifth and the ninth day of the disease; usually on the fifth or seventh day. Then the fever suddenly

subsides, and the patient is bathed in a profuse sweat (see Fig. 261). The respirations become deeper and more quiet, the cough loosens, the pains all disappear and the appetite returns. In short, the patient has with one bound, as it were, escaped death. Although the patient may feel comparatively well after the crisis, it is important for him to remember that the morbid

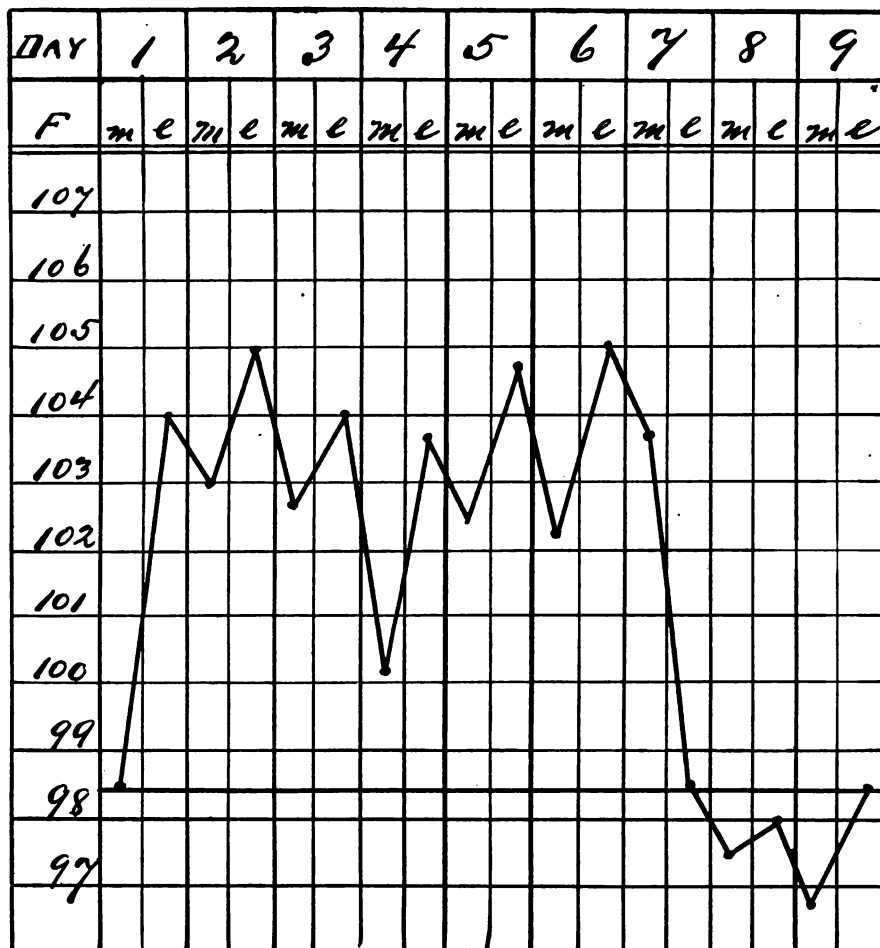


FIG. 261. Fever-chart of a typical case of lobar pneumonia, showing crisis on sixth day.

changes are still present in the lungs, and do not subside for several days. In rare cases the disease resolves itself, not suddenly by *crisis*, but gradually by what is known as *lysis*. In most cases the seat of the affection is in the lower lobes of the lung, more often in the right lung than in the left. The inflammatory process, however, may involve also the apexes of the lungs; and migrating inflammations (that is, such as attack the various parts of the lungs in succession) also occur.

Pneumonia attacks people of all ages; but affects more men than women.

It is more frequent during winter and spring than in summer and autumn; and it has occasionally occurred epidemically in some dwellings, towns, prisons, barracks, schools, convents, etc. The disease is largely due to a special form of bacteria,—the *Pneumococcus* of Weichselbaum; the *Diplococcus pneumoniae* of other authors. Colds, which formerly were held responsible for the disease, are now looked upon merely as occasional causes. By injuring the mucous membrane of the lungs they enable the bacteria to enter the tissues, there to begin their harmful activity. Contusions of the chest may also be regarded as occasional contributory causes. Instead of acquiring an immunity by one attack of pneumonia, the disease seems to show a tendency to recur. Some patients may have as many as four or five invasions.

In the treatment of the disease the physician usually restricts himself to combating the particularly annoying disturbances. He endeavors to ameliorate the pain in the sides, to reduce the fever, to lessen the cough, to keep the conditions of excitement (delirium) within moderate bounds, and to further the loosening of the sputum. But his main attention is directed to the heart. The great danger in pneumonia does not come from the lung involvement, but from the heart. If this organ grows weak and threatens to relax, it must be relieved by proper means, and must be stimulated to a more vigorous activity so that the patient may be able to stand the crisis. This careful watching of the heart is one of the most important tasks of the physician, because his timely interference in case of threatening danger may save many patients who otherwise would have succumbed. Such a responsible task, however, requires an exhaustive knowledge of the disease, of its course, and of the methods of examination; and this is possessed only by a physician.

Until the fever subsides the diet should consist of plain, pure water or mineral water, bland soups, and milk which may be stirred with the yolk of an egg or prepared with easily digestible flours. Preserved fruits, stewed apples, oranges, etc., are also permissible. The prescription of alcoholic stimulants is essential for habitual drinkers, but unnecessary in many other cases. The sick-room must not be too dark, and should be frequently ventilated. Pure, fresh air is of great importance. The fear that ventilation exposes the patient to the danger of catching cold is without foundation. Draft or cold air can become harmful only when the fever has receded and recovery begun. Warmer covers and the placing of a screen in front of the bed during the airing of the room will then afford sufficient protection. The sputum should be caught in a glass receptacle filled with a disinfecting solution.

The peculiar course of pneumonia suggests some important practical explanations. It occasionally happens that it is not the nature of the disease nor the constitution of the patient that is held responsible for the steady

progress of the affection until the crisis sets in, but the physician. The doctor's inability to "check" the disease arouses unjust criticism, especially in families whose members are disturbed by the agitations of opponents of "old school medicine." And it often happens that during the worst period of the disease (shortly before the crisis) the regular attendant is dismissed, and another called, possibly a "natural healer." If the crisis has taken place in the meanwhile, the newcomer has the satisfaction of having the patient appear as if he were transformed, and free from all danger. The members of the family ascribe this result to the "immediately successful" treatment of the new helper, without considering that the favorable turn had been due to the previous treatment during the anxious and important days preceding the crisis. They thus greatly wrong the physician whose careful supervision and treatment, although unable to check the progress of the disease, enabled the patient to overcome the crisis. The layman should, therefore, beware of erroneous and hasty conclusions.

If the course of the disease be unfavorable, it leads rapidly to a fatal termination. In rare cases suppuration, gangrene, or shrinking of the lungs may supervene. Since a healthy heart is of great importance in the battle with pneumonia, it follows that drunkards, persons with weak hearts, the obese, and the aged are in great danger.

In addition to the classical type of pneumonia, other forms develop in the course of certain diseases, such as typhoid fever, influenza, etc. There is, moreover, a so-called catarrhal variety of pneumonia, which occurs most frequently in children and in the aged, in connection with bronchitis (in measles, whooping-cough, smallpox, and diphtheria). This type, which is called *bronchopneumonia*, does not run as regular a course as ordinary pneumonia. It is of longer duration, lasting several weeks or months, and it does not improve suddenly but gradually. The sputum, which is usually absent in cases of small children, is never admixed with blood. Treatment consists in warm baths with cool to cold affusions, chest-packs, medicines, and proper food. Bronchopneumonia is a very serious affection in small children.

LUPUS.—A form of tuberculosis of the skin and of the mucous membranes; called also "herpes exedens." It is possible that the tubercle-bacillus colonizes in these patients because they possess a certain power of resistance to its general poisonous action. Lupus is a disease of youth, and is extremely persistent. Its onset is manifested by the appearance of small grayish-red nodules which slowly disintegrate, forming a superficial ulcer which gradually becomes covered with a scar, while new nodules and new ulcers appear at the margin in the healthy skin. The favorite seats of lupus are the sides and back of the nose, and the lips, and cheeks. It may, however, occur on all parts of the face; rarely in the pharynx and larynx. The affection, which is painless, is sometimes arrested spontaneously, to

flare up after a long interval. Injections of tuberculin may cause such a flaring up within a few days.

Lupus of the mucous membrane of the nose may occur without affection of the external nose. It appears especially in the conchæ of the nose, where it occurs in the form of small nodules which readily bleed when touched, are covered with crusts, and disintegrate into ulcers. Lupus is treated as is tuberculosis. The affected parts of the mucous membrane are scraped and cauterized. Lupus of the skin is now treated successfully and without disfigurement by the Finsen method (see **LIGHT-TREATMENT**), and with Roentgen rays.

LYMPHADENITIS.—Inflammation of a lymphatic gland. These glands are everywhere inserted in the lymph-channels, and may become affected by poisonous substances carried into them through the lymph-vessels from an inflamed area. When this takes place an inflammatory reaction is set up in the glands, which causes the latter to swell and to become very sensitive to pressure. The glands may then be felt as coarse lumps under the skin; as in the armpit, under the jaw, on the neck, or in the groin. If the glands suppurate, the skin becomes red and inflamed. See **BUBO**.

Persistent inflammation of the lymph-glands (such as may be observed in scrofula, tuberculosis, and in venereal diseases) likewise cause swellings, but as a rule these are painless and unaccompanied with fever. The swellings usually recede when the general condition improves.

LYMPHANGEITIS.—Inflammation of the lymph-vessels. These vessels have the functions of absorbing the juice (the *lymph*) which permeates all the tissues of the body, and to carry it back to the blood-current (see pp. 17-18.) When an inflammatory process takes place in any part of the body the lymph-vessels may, therefore, receive and carry along poisonous substances which will cause them to become inflamed. Such inflammation of lymph-vessels becomes manifest by the appearance of reddish streaks in the skin, extending along the course of a lymphatic channel. They appear most frequently on the arms, extending from hand to armpit. Inflammation of lymph-vessels is usually accompanied by pain and fever, and is an important sign that the inflammatory process is spreading from the original area. It therefore requires prompt and careful treatment (see **INFLAMMATION**). Blood-poisoning spreads through the lymph-vessels; and a knowledge of the lymphatic system is, therefore, of great service to physicians.

LYSOL.—A powerful antiseptic and germicidal liquid, consisting of a fatty solution of tar-oil, subsequently saponified with the addition of alcohol. It is a clear, brown, oil-like liquid, with an odor resembling that of creosote. Lysol is generally used in weak solutions ($\frac{1}{3}$ to 1 per cent.) as an antiseptic wash; and although it is a more powerful germicide than corrosive sublimate, carbolic acid, etc., it is said to be less poisonous and irritating when applied to ulcerated areas.

THE STANDARD FAMILY PHYSICIAN

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MAGNESIUM, SALTS OF.—Magnesium is a light, white, metallic element, the salts of which are largely used in medicine as laxatives. Their use is especially indicated when it is desired to get a quick result; or when a watery movement is particularly wanted in order to reduce the amount of fluid in the body, as in dropsy, uremia, etc. Magnesium salts are not at all irritating to the bowel; and their stimulating action is probably due to their mere weight, or, when given in concentrated solutions, to the fact that they extract fluid from the body into the gut, on account of the osmotic relation (see **SALTS, ACTION OF**). Thus, instead of absorption, the process is reversed, and the gut quickly empties itself in protest.

Magnesium citrate is administered in an effervescent mixture containing sirup and an excess of acid. This makes a very pleasant drink, not unlike lemonade. *Magnesium sulfate* or *Epsom salts* is in common use. One or two tablespoonfuls in water is very effective, but to many people such a dose proves nauseous. The carbonate and the oxid, or what is commonly known as *magnesia*, are much less active as laxatives. They are both alkaline in reaction, and are used as antacids and mild laxatives.

Magnesium salts, like other saline laxatives, are usually administered before breakfast, often to augment the action of some vegetable laxative given the night before. They usually act in the course of an hour or so.

MALARIA (INTERMITTENT FEVER).—A febrile affection characterized by alternating attacks of fever, chills, muscular pains, and perspiration. It is of quite frequent occurrence in the United States, southern Europe, and, particularly, in the tropics. In the northern and central parts of Europe it occurs only in isolated places. In the tropics malaria causes a great deal of sickness among Europeans; and upon the prevalence of this disease depends the healthfulness or unhealthfulness of a district. The disease is caused by micro-organisms which belong to the lowest animal group (*Protozoa*). These organisms enter especially the red blood-cells and destroy them. The infection is transmitted from one person to another by certain varieties of mosquitoes. When a mosquito has sucked blood from a patient affected with malaria, the parasites enter the insect's body where they undergo a certain development; after a number of days the mosquito may bite a healthy person and transmit the microbes with the

bite. Hence malaria occurs only in districts infested with certain mosquitoes. The fact that stagnant waters, which furnish the favorite breeding-places for mosquitoes, are present in such infected localities, has given the disease the additional name of marsh-fever.

Malaria usually manifests itself by attacks of fever which occur at certain intervals. These fevers are preceded by general symptoms, such as malaise, a sensation of leaden heaviness in the limbs, disinclination to bodily exertions, loss of appetite, nervous irritability, etc. In many cases, though not regularly, an attack begins with a violent chill, or at least with chilliness, which is followed by a sensation of heat. A more or less pronounced swelling of the spleen often develops at the same time. The duration of the attack varies. In mild cases it lasts about six hours; in the severe ones, from thirty to thirty-six hours. With the appearance of perspiration there is a more or less rapid drop in the temperature, accompanied in many instances with complete, or almost complete recovery of health. This condition continues for a certain length of time, varying according to the form of the fever. Then an attack similar to the first one takes place. Unless suitable treatment is instituted, these attacks may continue to recur at longer or shorter intervals; and in severe cases, particularly in persons who have been much weakened by fever, death may result from paralysis of the heart.

According to the periodicity of the fever, physicians distinguish between *quotidian fever* (recurring with one day's interval), *tertian fever* (two days' interval), *quartan fever* (three days' interval), etc. In individuals who live in malarial regions, and who are not treated more or less systematically for their attacks, a chronic malarial poisoning takes place which may be protracted for months or for years. In these cases the chief symptoms are swellings of the spleen and liver, dropsy, and inclination to hemorrhages.

The specific remedy in most cases of malaria is *quinin*, which destroys the parasites. In order to attain this end, however, it is necessary that the proper quantity of the drug be given in each individual case, and that it be given in the right form and at the right time. The decision as to these points must be left to the attending physician. Persons who contemplate living in tropical regions in which malarial fever is prevalent, and in which medical aid can often be obtained only with difficulty, should never neglect to obtain thorough information regarding the nature of the disease and the proper administration of quinin in the same. The most important measure for the prevention of malaria is the extermination of mosquitoes by the destruction of their breeding-places, and the killing of their larvæ. The best means for accomplishing this is through drainage of swamps, and the use of crude petroleum on stagnant pools. Protection against the bites of mosquitoes may be afforded by wearing proper garments, and by the use of mosquito-netting to prevent their invasion of dwellings. Quinin should be taken at judicious intervals.

MALE-FERN.—See **ASPIDIUM**.

MALT.—The seeds of the ordinary barley which have been germinated by moisture and heat and then dried. If this process has taken place at a moderate temperature, a starch-digesting ferment (*diastase*) is formed. This ferment is capable of converting about two thousand times its own weight of starch into dextrin and glucose. The various malt-extracts are supposed to contain diastase, but in many of them the ferment has been destroyed by heat. These preparations usually contain more or less alcohol and glucose, and are therefore of some nutrient value even though they fail in their object of aiding in the digestion of starches. Diastase is ultimately



FIG. 262. Girls suffering from maniacal delirium.

destroyed by the gastric juice; and in order to get the best results the malt should be taken immediately before meals.

MANIACAL DELIRIUM.—Many mental diseases are accompanied by conditions of great agitation which may arise from various causes. The term “maniacal delirium” is ordinarily used to denote those mental diseases which are the reverse of melancholia, and which are called *mania* by the alienists. Maniacs are cheerful, lively, and self-conscious; also restless and unsteady (see Fig. 262). They make themselves conspicuous by quarreling and mocking, by being garrulous and dissolute, and by being addicted to drunkenness and extravagance. They are intriguing, and they offend the penal, moral, and social codes by their actions. In pronounced cases of mania there is an increased restlessness which degenerates into the uttering of wild yells and insulting remarks. Such patients rave, dance, and jump; and they rejoice in the wilful destruction of property, every vestige of self-respect having disappeared. Patients who suffer from a mild

form of mania are often regarded as unprincipled weaklings on account of their conceit, their witty retorts, and their ungoverned impulses.

Maniacal delirium generally lasts several months. It is usually curable, but is prone to recur (periodical mania), or to alternate with attacks of melancholia in periods lasting weeks or months (manic-depressive insanity). Mention may be made of the supernatural physical strength which these patients, and mentally deranged persons in general, are supposed to possess. Such persons are not physically stronger than persons of normal mentality; but their total disregard of others, and the absence of fatigue, simulates an abnormal muscular power. It is indeed a remarkable fact that some maniacs can remain in a state of constant excitement for weeks and months, day and night.

MANIC-DEPRESSIVE INSANITY.—See INSANITY.

MANNA.—A sweetish, sugary exudation of a European tree, the *Fraxinus Ornus*. It is a very mild laxative, and is commonly used as a basis for more active drugs. One or two teaspoonfuls of manna may be added to a baby's bottle in case of constipation.

MARRIAGE.—Many persons marry at too young an age. This is especially true among the laboring classes, where marriage often takes place between very young people, to their own detriment as well as to that of their children. The ages at which marriage is lawful in the various countries and states might well be set at twenty-five years for men and twenty years for women, although children may be procreated by younger people. Children born of very young parents are often weakly. The same applies to children of parents whose ages differ very much, as when the husband is about twenty years older than the wife, or the wife considerably older than the husband. The ages of a married couple should not be too wide apart, although it is well for the husband to be a few years older than his wife. Marriages between relatives can not always be approved of from a sanitary point of view. Their children are often sickly, deformed, deaf and dumb, or idiotic. See MENTAL DISEASES.

Only healthy persons should be allowed to marry. The children of diseased parents are usually sickly. When but one of the parents is diseased the child may be born healthy; but even in these cases the sickness of the parent will often affect the child. It appears that predisposition to disease on the part of the mother is apt to be inherited chiefly by the sons; that of the fathers, by the daughters. It is advisable for young people who contemplate marriage to undergo a thorough medical examination. This may be best accomplished by making application for a life-insurance policy. A person rejected by an insurance company should forego marriage. This could readily be carried out if parents would always make their consent to the marriage of their child subject to the admission of the other party to life-insurance. Fathers and mothers should especially see that their daughters are not married to syphilitic men.

Marriage should not be contemplated by persons in whose families tuberculosis is inherent; nor by those who themselves have recovered from pulmonary tuberculosis. Individuals suffering from epilepsy or other forms of convulsions, as well as those who have suffered from syphilis or from a mental disease, should likewise forego marriage. If such persons marry they should at least feel morally obliged not to beget children.

MARSH-FEVER.—See MALARIA.

MARSHMALLOW (ALTHÆA).—The root of *Althæa officinalis*, a perennial European herb. It occurs in the market in cylindrical pieces, white



FIG. 263. Massage of the fingers.

and hairy externally, and fleshy internally. Its odor is faintly aromatic, and its taste sweetish. Marshmallow is used, in the form of a sirup or a decoction, as a demulcent in various mild catarrhal conditions of the respiratory passages. Its soothing effects are largely due to the great amount of mucilage it contains.

MASSAGE.—A method of treatment whereby the body, or part of the body, is manipulated by percussion, etc. In the simple form of *embrocation* it is one of the oldest and most popular treatments. The principal efficacy of this method has been popularly ascribed to the various remedies used for embrocations, such as opodeldoc, spirits of camphor, formic spirits, etc. These, however, are of less importance than the manipulation, although it must be admitted that they sometimes assist the action.

There are four main forms of massage in popular use: (1) Stroking; (2) kneading; (3) percussion (slapping); and (4) circular rubbing. The

different manipulations can not be learned from their description, but only by practical instruction. Since massage treatment for curative purposes should be administered only by physicians, a complete description is not necessary here. Only massage by stroking (the efficacious part in embrocations) and massage by percussion shall here be treated at some detail.

Massage by stroking is performed with the palm of the hand, which has previously been greased with oil or vaselin in order to overcome friction. The hand is then placed on that part of the body which is to be massaged, and is passed over the skin with more or less pressure. When the terminal point has been reached, the hand is raised and brought back to the starting point to repeat the manipulation, so that pressure is exerted in one



FIG. 264. Massage of the hand.

direction only. Instead of the palm of the hand, the ball of the thumb or the tips of the fingers may be used. On arms, legs, and throat, massage should always be made *toward* the heart.

Figs. 263 to 271 show how the different parts of the body may be stroked best and most comfortably. The fingers are taken one by one between the thumb and the slightly curved index-finger (see Fig. 263). The hand is massaged either with the thumb (see Fig. 264), the ball of the thumb, or the palm of the hand. The forearm is held so that the thumb is turned upward, and the little finger downward; the elbow-joint is slightly bent. The upper half is stroked first; then the lower (see Fig. 265). The upper arm is divided into an inner half which is turned toward the body, and an outer half which is turned away from the body. On the inner side one should stroke up to the armpit; on the outer half, up to and over the shoulder (see Fig. 266). The toes, the soles of the foot, and the back of the foot are

stroked as are the fingers and hand. In the lower leg the bone on the inner forepart is located immediately beneath the skin. Hence only the outer half and the calf of the leg should be stroked with the palm of the hand.



FIG. 265. Massage of the forearm.

When the calves of the leg are massaged the patient is placed upon his belly, his lower leg being slightly raised by the masseur (see Fig. 267). The thigh



FIG. 266. Massage of the upper arm.

is stroked in front, and on the inner and outer surfaces, with the palm of the hand. The limbs should be held as loosely as possible while being massaged.

The back may be massaged with upward or with downward strokes. The hands are placed close together on both sides of the spinal column, and the upward strokes are made to the shoulder and to the armpit alternately (see Fig. 268). The downward strokes are made by beginning at the nape of the neck, bringing the hands downward as far as to the region of the groin (see Fig. 269). When massaging the nape of the neck the masseur stands behind the patient (see Fig. 270). The forehead is massaged by placing both thumbs near each other directly over the nose, stroking in the outward directions, while the other fingers support both sides of the head. When massaging the chest the hands are placed upon the breast-bone, parallel to each other, and stroked along the ribs. The female breasts should not be stroked. The throat may be stroked by the patient himself (for in-



FIG. 267. Massage of the lower part of the leg.

stance, to divert morbid action in coryza, in catarrh of the pharynx, and in tonsillitis). The head is bent slightly backward, and the palm of the hand placed upon the throat below the jaw, stroking downward. The thumb is on one side, the fingers on the other side of the throat (see Fig. 271). Pressure is exerted upon both sides, where the principal veins run their course from the head to the chest. The right and the left hand should be used alternately, and the different strokes should be made in rapid succession.

The practised masseur alternates with both hands also in other manipulations, according to convenience. Massage of the abdomen should be given by experts only. Stroking is sufficient for ordinary requirements. If other forms of massage be found necessary, the physician should give the needed directions.

Various instruments (such as muscle-percussors, hammers, and rollers) have been manufactured for the purpose of replacing the hands in giving massage; but none of these has become very popular. The skilled masseur always prefers to use his hands. Apparatus which are set in motion by hand or by motors have recently been introduced for vibratory massage, and have proved very efficacious.

The effects of massage vary according to the manipulations employed. Stroking promotes the circulation of the blood and of the tissue-juices, thereby producing a better nutrition of the tissues, removing congestions, and combating conditions of fatigue. Kneading strengthens the muscles and increases their blood supply. Percussion and vibration harden the

muscles, relieve nervous pains, and strengthen weakened nerves. Rubbings tend to crush remnants of inflammatory processes, and to distribute blood exuded under the skin after injuries, thus facilitating their absorption by the lymphatics of the body. Scars and adhesions are loosened and separated by rubbing and stretching.

Massage may be employed in the treatment of a large number of diseases. The most important of these are rheumatic pains of the muscles and joints, affections of the stomach or of the intestines (especially constipation), nervous diseases, occupation spasms (for instance, writers' cramp), enuresis, inflammations of the sheaths of tendons, many joint-disorders,



FIG. 268. Massaging the back with upward strokes.

contusions, sprains, etc. During convalescence after protracted diseases massage of the legs is useful in strengthening the weakened muscles.

In healthy individuals massage acts most beneficially and refreshingly after fatigue, athletic overexertions, etc. It increases also the strength and flexibility of muscles that are not fatigued, and may therefore be recommended to wrestlers, gymnasts, athletes, dancers, etc.

A new domain was opened to massage by the Swedish physician Thure Brandt, who introduced it in the treatment of female diseases. His method is now employed principally to remove old remnants of inflammations and adhesions in the abdomen.

Although massage is a successful and important method of treatment, it is by no means a cure-all. In many cases it leads to results only in combination with other measures—medicinal, operative, or otherwise. In many morbid conditions it is even dangerous. Massage must not be employed in fresh inflammations, superficial or deep-seated suppurations, malignant

tumors, ulcers of the stomach or intestine, pregnancy, and in many skin diseases. The indiscriminate practise of massage by lay persons has often caused severe injury to health, and in many instances death. Excessive suppurations, inflammations of the peritoneum, morbid pregnancies,



FIG. 269. Massaging the back with downward strokes.

abortions, hemorrhages from the womb, floating kidneys, fractures, loss of sight, etc., have resulted from such reckless application of massage. It is well known that "massage" is only a cloak for many persons who are immoral and wicked. Great care must therefore be exercised in the choice of a masseur.

Massage for curative purposes should be practised only by physicians, who alone are sufficiently familiar with the structure of the human body, with the position of the muscles and of the blood-ves-

sels, and with the seat of the focus of the disease. In their hands massage is often successful even in cases where lay persons have massaged for some time without results. This requirement applies especially to Brandt's abdominal massage. Since most women affected with abdominal disorders suffer from inflammations of the internal sexual organs, which, aggravated by massage, may lead to a fatal termination or to long-lasting illness, a positive recognition of the existing disease is necessary in every instance. Diseased women, therefore, should consult neither masseuses, nor osteopaths, nor "natural healers," but only a physician trained in massage. It is to be regretted that competent training in massage is given in only a few medical colleges in the United States. If more physicians were competent masseurs there would be fewer lay practitioners.



FIG. 270. Massage of the neck.

Massage by percussion is carried out in the following manner: The patient, entirely undressed, stands alongside the bed on a woolen mat.

The nurse or attendant must have at hand a linen or muslin sheet and a large woolen blanket. The sheet is immersed in a pail of water, the temperature of which may vary between 77° and 68° F. according to the physician's decision in each individual case. When the patient is ready the sheet is wrung out thoroughly and thrown over his shoulders so as to envelop the entire body (see Fig. 272). With light strokes of the hand the attendant then slaps the patient everywhere from above down, momentarily bringing the sheet in contact with all parts of the body (see Fig. 273). This must be done rapidly, and should not consume more than half a minute. The colder the water employed, the more stimulating the result. This is shown by the temporary inhibition of the respiratory act. The heart beats slower, but stronger. As soon as the slapping is completed the wet sheet is thrown aside, and the patient enveloped in the woolen blanket and rubbed until dry. The patient must get warmed rapidly; and if this be not accomplished by the rubbing, he should at once be put back into bed with some hot-water bags, and given a hot drink. In the cases of patients who do not get warm readily after this treatment, it is well, when the procedure is to be repeated, to make their bodies comfortably warm before applying the cold sheet. This may be accomplished by hot packs, hot-air baths, etc. If the patient be strong enough he may be allowed to take a walk after the treatment.



FIG. 271. Massaging the throat.

Percussion massage is not applicable to all persons. Children and aged people should not be subjected to the treatment; nor should it be given to patients who are unable to stand without support, or who are suffering from fever or vertigo. Other contra-indications are extreme weakness, anemia, emaciation, many skin-diseases, pulmonary complaints with a tendency to hemorrhages, and diseases of the heart and of the blood-vessels.

MASTIC.—A resin obtained by incision into the bark of the *Pistacia lentiscus*, a small evergreen tree of the cashew family. It occurs as pale-yellowish, brittle tears, having a balsamic odor. It is used for making temporary fillings for teeth. Internally it is given in combination with aloes as a laxative.

MASTOID, DISEASES OF.—In acute or chronic suppurative inflammations of the middle ear ("running from the ear") the suppuration may

extend to the mastoid process, a conical prominence of the temporal bone situated behind the ear (see p. 29, and Fig. 28), and fill its cells with pus. In some cases a fistula forms behind the ear or in the auditory canal, so that the pus finds an outlet; but in other cases it becomes necessary to open the bone in order to avoid involvement of the brain. Fatal suppurative inflammation of the brain or of the meninges may result from suppuration in the mastoid process. A timely operation, however, usually averts this danger. Inflammation of the mastoid is characterized by pain in the bone and by swellings behind the ear. When these conditions are present no time should be lost in consulting a physician.

MASTURBATION.—Onanism or masturbation is the procedure by which a discharge of semen is brought about without sexual intercourse. In the



FIG. 272. Massage by percussion.
(Enveloping the patient.)



FIG. 273. Massage by percussion.
(Slapping the patient.)

female even a simple irritation of the sexual organs must be thus designated. Masturbation (playing with, and irritating, the genitals) is frequently found among children of both sexes, although, of course, without the discharge of semen. Vile-minded nurses sometimes endeavor to quiet crying children in this manner. Mothers should know this, and strictly watch the persons attending to their children, so as to avoid dangerous consequences.

Onanistic tendencies often manifest themselves even in very small children, who get into the habit of rubbing their legs together, etc. Itching irritations, uncleanness, intestinal worms, etc., are not infrequently causative factors. In schools and other educational institutions masturbation often spreads by mutual seduction, and such places are often actually infected with onanism. Many a boy or girl develops during this period a weakness of the sexual organs, which may remain for life.

In many cases masturbation ceases when the child becomes old enough

to use its reasoning powers; and in such instances it may have caused no permanent harm. But more often it is continued, even after marriage, or taken up again later on. Naturally, this habit is detrimental to the nervous system. Masturbation is harmful if practised too frequently or for too long a time. These cases are usually due to hereditary or acquired tendencies to nervous debility or mental affections. It is incorrect to teach that ordinary onanism causes mental disorders or diseases of the spinal cord. The inverse, rather, is true. Long-continued onanism proves that the affected person possesses an abnormal nervous system; that he is not a sinner, but a deplorable patient.

Special caution should be raised against unscrupulous publications in which the "vice of youthful errors" is depicted as the cause of countless diseases. This is absolutely untrue. Such publications purport to frighten the already despairing patients, in order to make them apply for treatment to the authors of these books, who derive their illicit profits from such condemnable practises.

When masturbation is continued for years it will eventually lead to a weakness of the sexual organs, causing impotence, spermatorrhea, or, in most instances, a secretion of mucus from the prostate gland (see SEMINAL LOSSES). In the female it gives rise to catarrh of the womb, and to exaggerated sensibility. Other resultant disturbances are headache, anxiety, irrepressible thoughts, palpitation of the heart, backache, great weakness, etc. These conditions can be cured when the practise of masturbation is suspended, even if it in many cases may require some time.

In order to prevent masturbation children should be carefully watched and protected, and young people should be instructed regarding the sad consequences of this practise. Strengthening of the body, and an appropriate occupation of the mind are requisite factors in curing the habit

MATCHES, POISONING BY.—See PHOSPHORUS-POISONING.

MEASLES.—An acute, eruptive, infectious disease, the cause of which is as yet unknown. It is very contagious, and during an epidemic of measles a child previously unaffected rarely escapes. One attack of measles usually renders the individual immune to the disease, and for this reason adults are seldom affected since they have generally had measles as children. In large institutions (insane asylums, jails, etc.) adults may, however, frequently contract the disease. The average time elapsing between the infection with the virus of measles and the appearance of the eruption upon the skin, is fourteen days. Prior to this, there appears so-called "fore-runners" (*prodromi*), such as cough, running from the nose and eyes, and high fever of short duration. After these prodromi have been present for three days the eruption appears, usually with a marked rise in temperature (see Fig. 274). This eruption, which begins in the face, usually spreads over the entire body within twenty-four hours. It consists of light or dark red spots,

slightly raised above the skin, and varying in size from that of a pin-head to that of a pea. They occur either as isolated spots, or they may merge into large patches, covering extensive areas of skin. The catarrhal premonitory symptoms (particularly the cough) are usually aggravated upon the appearance of the eruption. Three or four days after its onset, the eruption begins to fade, those spots which appeared first being also the first to vanish. At the same time the fever begins to abate; the running of the nose and eyes becomes less troublesome; the cough loosens; and the skin peels off in bran-like scales. If nothing disturbs the course of the affection, the children should remain in bed for six to ten days. They should not leave the room for another eight days, and under no circumstances before

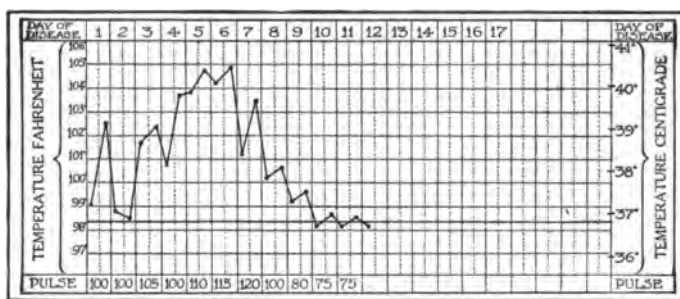


FIG. 274. Temperature chart of a typical case of measles.

(Note that the fall of temperature which sometimes occurs on the second day is recorded.)

the scaling-off process has terminated. The time is best determined by the physician, who will take into consideration the season, the condition of the weather, and the general state of the child's strength.

The course of the affection is not always as favorable as described in the foregoing. Various diseases (such as pneumonia, exhausting diarrhea, croup, inflammation of the middle ear, etc.) may supervene, which will delay recovery or perhaps cause death. Inflammation of the middle ear may begin very inconspicuously. When a child who has recovered from measles complains of pain in the ear, or when one who can not speak frequently takes hold of the ear, the physician's attention should at once be called to this symptom. In rare cases the virus of measles may be so powerful that the affected person dies within a short time. Tuberculosis often develops in connection with measles; or, if it has been present prior to the attack, its progress is considerably furthered.

Owing to the great susceptibility of children to the poison of measles, many parents do not pay much attention to the prevention of the disease; in fact, they even purposely expose the healthy children to the infection, in order that all the children may pass through the affection at the same time. This method is very dangerous, and even criminal. If the malady unexpectedly runs a severe course and terminates fatally, or if a child suffers

lasting impairment of health, parents should reproach themselves most severely. Children under five years of age (especially those who suffer from rickets, scrofula, tuberculosis, or chronic bronchitis) should always be carefully protected against infection; older, healthy children only when the epidemic is a malignant one. Effective prevention, however, is possible only by removing the children to a locality free from measles immediately upon the appearance of an epidemic. If nothing be done until the infection has actually entered the house, it is usually too late, as measles is probably infectious before the appearance of an eruption. The possibility of infection ceases when the eruption fades. Measles can be transmitted neither by healthy persons nor by household utensils. In children who have not had measles, every attack of cold in the head, accompanied with cough and with running from the eyes, should be regarded with suspicion, and proper precautions taken.

Treatment of the disease, until the physician arrives, consists in rest in bed, moderate darkening of the room (which must be heated to 59° F. and frequently ventilated), and the administration of liquid food. Further measures which may be required in order to prevent or to alleviate complications that may have arisen, are the concern of the physician. Whatever he prescribes should be conscientiously carried out. There exists, unfortunately, a foolish belief among many people, that children affected by measles must not be washed. The fear that washing the child may cause the eruption to "be driven inward" is without foundation. The insufficient development of the eruption, to which the term "driven inward" has been applied, is not a consequence of washing, but of a supervening affection of the respiratory passages (pneumonia, for instance), which impairs the blood-circulation in the skin. This either causes the spots to fade, rendering them less distinct; or it prevents part of the virus from reaching the surface, thus making the eruption less extensive. Since measles may be a very dangerous disease a physician should always be consulted at the onset.

MEAT.—In the development of the human race the hunter preceded the tiller of the soil; and although meat does not have first place quantitatively in the customary fare of to-day, it plays a principal part in the nutrition of the human body, and will always continue to do so, as it is preeminently the source of vital energy and productive labor. Proteids, fats, lime-salts, and other salts are the chief nutritive elements in meat. Bones and cartilages, with their large percentage of lime, are digested only by dogs and by beasts of prey; but man ingests lime-salts in the jelly of congealed gravies and soups. Another main source of lime is the connective tissue which surrounds and permeates the red meat (muscles) of animals. This connective tissue, therefore, becomes a valuable nutritive substance to man. To be sure, it can not replace albumin; but, like the carbohydrates, it serves as an economizer of albumin.

Albumin is contained almost exclusively in the muscles. These may be considered as consisting of millions of the finest tubules, filled with albumin, and connected by lime-containing connective tissue, in combination with which they represent the meat as sold in the market. The tubules also contain connective tissue, and albumin can, therefore, be discharged from them only when they are open. The connective tissue is frequently interspersed with fat, which is found also independently in large accumulations, as, for instance, under the skin of the abdomen, and in the neighborhood of the kidneys, intestines, etc. Fat is of great importance to the human organism as a producer of heat and energy. Nevertheless, lean meat is preferable to that which contains much fat, owing to the larger amount of proteids of the former, and to its large percentage of tissue-salts, which are entirely absent from fat. Examination of the ashes of meat have disclosed that they contain potassium salts, phosphorus, iron, sulfur combinations, sodium salts, etc. Meat is, therefore, one of the most favorable natural combinations of foodstuffs, as it is able to satisfy various requirements of the body. Albumin is present also in cereals and in legumes; while cheese, which is a much cheaper foodstuff than meat, is likewise rich in animal proteids which the body is able to utilize to much greater advantage than vegetable albumin; but in none of these substances is the nutritive principle present in so digestible a form as in meat, and nowhere is it supplemented in an equal manner by the presence of salts.

The nutritive value of different meats varies considerably. The flesh of mammals shows a composition different from that of birds and fish; and a more detailed consideration of mammals shows essential differences in the value of the meat of different animals of the same species—in fact, of meat from the different parts of the same animal. Age, work, sex, and nutrition have a determining influence upon the composition of the meat; and the flesh of the young animal, with its abundance of water and lime-substances, is in contrast to that of the old animal, with its hard, tough meat, rich in salts. In general, it may be said that the best meat is that of full-grown, recently matured animals, which have been sufficiently fed, are not too fat, and have not been exhausted by work. The meat of those parts of the body which have been freely exercised during life is usually most palatable. Hence, loins, flanks, and back are preferred in most animals. Red meats are somewhat richer in extractive substances than the white meats. This is due to the fact that the former contain a greater amount of blood. In like manner is also the meat of birds distinguished from that of mammals. The flesh of fish, like that of calves, contains large quantities of water and lime-salts; they are rich in albumin, however, and must by no means be designated as of inferior value. The flesh of calves which were at least six to eight weeks old when slaughtered, and which had been sufficiently fattened, is by no means an inferior meat. The meat of an animal killed

when only a few days old is worthless; and a sensible housewife should place such meat on a par with unripe fruit, and never attempt to use it as a substitute for other meat. No meat should be used immediately after the animal has been killed; but, according to the season, it should be from one to several days old, as otherwise even the best meat is tough and not quite fit to eat.

The characteristics of meat should be known to every housewife. She should know that good meat is firm and elastic, and that it scarcely moistens

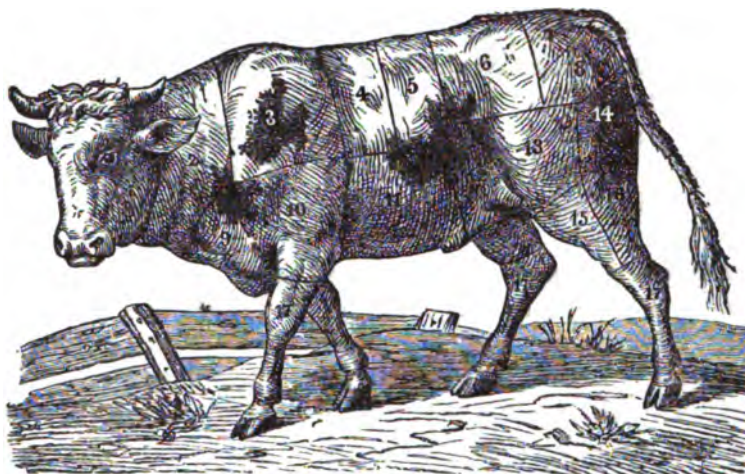


FIG. 275. Showing cuts of beef in the live animal.

1. Head; 2. neck; 3. shoulder (chuck); 4. forerib; 5. middle rib; 6. loin; 7. rump; 8. hip; 9. brisket; 10. shouldered clod; 11. plate and navel; 12. flank; 13. round; 14. mouse buttock; 15 and 16. second cut round; 17. shank.
First quality: 4, 6, 7, 8, 14, and tongue; second quality: 5, 10, 13, 15, 16, third quality: 3, 12; fourth quality: 1, 2, 9, 17.

the finger when pressed. Under no circumstances should the meat be wet, this being a sign of decayed meat which has already passed into a state of putrefaction. The housewife should know that good meat is of a uniformly red color, that it has no disagreeable odor, and that its fibers are short and delicate in contrast to the long, coarse, and broad fibers of inferior meat. An exact comparison of the value of the various parts of meat in the same animal is shown in Fig. 275, which has been taken from Dr. Neumann's "Systematik der Kochkunst." About the same differences as to quality prevail in the various animals whose flesh is used by man, and they are soon learned by experience. The great fluctuations which are possible with

Part of Animal	Albumin. Per Cent.	Fat. Per Cent.	Salts, Per Cent.	Actual Nutritive Value, Per Cent.
Neck	21.4	6.9	1.4	28.24
Brisket	19.7	7.5	0.8	27.11
Flank	20.5	6.4	1.0	26.95
Hind quarter	24.2	4.1	0.8	26.00

regard to the chemical composition of the different parts of the same animal, may be shown by the foregoing figures which are based on an analysis of the meat from an ox of medium fatness.

It is obvious that the figures to be considered can not be very high ones; but, since better quality always goes hand in hand with digestibility and palatability, the most expensive meat generally becomes the cheapest.

Figures referring to the nutritive value of the meat of different animals are given in Plate XIX. It is noteworthy that venison contains large amounts of albumin and salts. This is due to the method by which game is killed, causing a large part of the blood to be retained in the meat, to the benefit of the human organism. Caviar naturally contains much albumin, since it consists of the eggs of sturgeons and other fish. Oysters, on the other hand, are mostly overrated. According to Stutzer it takes fourteen oysters to equal the albumin value of one egg, and 223 to equal one pound of good, lean beef. Oysters, however, are readily digested when raw.

The different organs of animals, as well as the offal (liver, brains, pancreas, bones, cartilages, sinews, etc.), may with advantage be utilized for the table. Not only do these parts constitute about forty per cent. of the weight of the live animal; but they also have great nutritive values. The list is headed by the liver, the most savory organ, which on an average contains eighteen per cent. of albumin, two per cent. of fat, and five to six per cent. of sugar. Almost equal in value to the liver, but richer in fat, are the kidneys; whereas the brain, which contains only about eight per cent. each of albumin and fat, is considered to be less digestible owing to its peculiar composition. The nutritive value of the lungs is very insignificant; that of the heart slightly greater; whereas that of tripe is much higher. The pancreas, or sweetbread, is readily digestible, and has a high nutritive value. In the sinews, cartilages, and bones, the nutritive value consists chiefly of the lime-salts and gelatin.

Marrow-bones possess no advantages over other bones in the preparation of soups, except that the marrow contains a greater amount of fat. Broken bones always add to the strength (fattiness) of soups. To speak about the "strength" of soup is really incorrect, inasmuch as soup possesses no nutritive value, unless its abundance of fat be considered as such. The small quantities of albumin which precipitate as froth upon the boiling soup are thrown out by the cleanly cook; and apart from the fat, no strictly nutritive substances can be extracted from the meat and bones used in the preparation of soups. Water merely extracts the salts from the meat; and it does this the more thoroughly the smaller the pieces into which the meat is cut. When meat is placed in boiling water the albumin, coagulating, closes the pores of the meat, and prevents the water from reaching the inner parts. In this way some of the salts of the meat are preserved. If,

on the other hand, the meat be placed in cold water, gradually coming to a boil, the salts will be more thoroughly extracted, and the soup more savory. Meat which has been used for soup becomes tasteless, but does not lose its real nutritive value which consists in the albumin; and by proper seasoning very palatable dishes may be prepared from it. Although soup in itself possesses no distinct nutritive value, it is of great importance as a stimulator of the appetite owing to the amount of meat-salts it contains. It is also a most suitable means of administering other nutritive substances, such as eggs, minced meat, cereals, cheese, etc. Meat-extracts, which are nothing but evaporated and dried bouillon, are likewise valuable as stimulants, especially when fresh soup is not available. Gelatin, the chief ingredient of jelly, while not directly utilized as a proteid food, is termed by the dietists as a proteid-sparer.

The usual methods of preparing meat for the table (roasting, frying, broiling) entail a considerable loss of salts, thus rendering the meat less easy to digest. Careful chewing, however, will partly compensate for this. Cooked meat, moreover, is decidedly preferable to raw meat, because of the danger of infection which the eating of uncooked flesh always carries with it, despite the most careful inspection. Trichinæ, tapeworms, tubercle-bacilli, and other parasites may enter the body with raw meat. The eating of raw chopped meat is particularly improper, because this usually contains inferior meat and offal. Chopped meat should not be used for cooking purposes unless it is known to be strictly fresh and wholesome.

One of the best methods of preparing meat is by roasting it in a pot which contains a small quantity of water. In this way the nutritive substances of the meat are best preserved. Meat which is fried loses part of its nutritive value; and a still greater loss takes place by the process of broiling, which, however, renders the meat very palatable. When roasting a piece of meat it is essential that the albumin of the outside coagulate as quickly as possible, in order to preserve the juices in the interior of the meat. The oven should, therefore, be very hot when the meat is placed therein. In a properly roasted piece of meat the crust should be hard enough to prevent the juice from escaping, yet soft enough to admit of easy slicing. The interior of the meat should not be too raw, underdone meat being subject to the same objection as raw meat. The fibers of the meat should appear separate, and the cut should be pink, not dark red. The processes of salting, smoking, and pickling make it possible to preserve meat and fish for longer periods, but they always entail a loss in nutritive value and a diminution of digestibility. It should always be borne in mind that smoke will destroy trichinæ only when the meat is exposed to its action for a sufficiently long time. Smoked articles make greater demands upon the stomach than freshly prepared ones. This fact is of particular importance in the nursing of the sick.

MEDICATED BATHS.—See BRAN-BATH; HERB-BATH; MUSTARD-BATH; PINE-NEEDLE BATH; SULFUR-BATH, ARTIFICIAL.

MEDICINE, HISTORY OF.—For the beginnings of medicine, as for much else that is of importance in modern life, we must look to the Far East, even to China, where civilization had reached a high state of development while Europe was still in a primeval condition. At that time China had, in all probability, a fairly well systematized fund of medical knowledge, including pharmacology and anatomy, the latter subject, however, hampered by the fact that two of the religions of the country, the Alman and the Buddhist worship, forbade the section of either the human body or the bodies of lower animals. The first Chinese works on medicine are said to have been written as early as 2698–2599 B.C., and there are traditions of one Shinnong, a semi-mythical medicine-man, even earlier.

India, also, antedates by at least a century the Grecian cult of Æsculapius with the “Vedas,” its sacred books, which contain descriptions of the human body based on dissections. Egypt, too, contributes, perhaps as early as the sixteenth century B.C., and some of the terms in the Hippocratic nomenclature betray its Egyptian origin. Yet the popular impression which associates the Greeks with the foundation of medical knowledge is, after all, justified, since it was the school of medicine situated on the island of Kos which laid those foundations firmly enough for the rearing of the subsequent superstructure as we know it to-day. It was in Greece, too, that the profession was fully recognized; and it is to Greece that we owe the rise of the professional conscience and the formulation of the Hippocratic oath which still binds the physician swearing by “what he holds most sacred,” though the gods of his Greek predecessors have vanished.

Seven or more physicians taught under the name of Hippocrates, and the medical knowledge of the time is to be considered as the accumulation of the school rather than the achievement of one man, although Hippocrates II., who flourished about 430 B.C., was the great Hippocrates. After his death the school seems to have fallen off somewhat, in spite of the efforts of Polybus, Syennesis, Diogenes, and Praxagoras. Aristotle (384–322 B.C.) introduced a more exact scientific method, and the dissection of the lower animals at this time brought to light much that is still in use.

Following Aristotle's time comes the brilliant Alexandrian period, when the Greek learning was largely transferred to Egypt, centering around the Alexandrian museum. This period is signalized by the authorization of human dissection; and the names of Erasistratus and Herophilus stand out conspicuously among the leaders of the time. The emphasis laid upon anatomy by the followers of Erasistratus and Herophilus was disregarded in large measure by the empirical school under Serapis and Phalinus, which came into prominence as the Alexandrian school declined, and Rome rose to supremacy. In medicine, as in art and literature, Rome levied tribute

upon the intellect of weaker countries; and her physicians were still Greeks. Asclepiades (126-56 B.C.) figured in the founding of the atomic school at Rome. Rufus of Ephesus is another notable name of the period; and Aurelius Cornelius Celsus (25 B.C.-40 C.E.) contributed largely to the department of therapeutics, and in addition to this he compiled the works of those who had gone before him. In the year 165 there came to Rome a Greek physician, Claudius Galen from Pergamos, who brought with him the last spark of the waning Alexandrian school, and in whose writings much of what was then known of the Hippocratic school has been preserved. Galen also systematized the knowledge of anatomy as it existed at that time, making what may very likely have been the first experimental physiological studies.

For some centuries after the death of Galen nothing of importance was achieved in medicine. Roman civilization was checked in its spread by the barbaric northern tribes, and degenerated at home. It is not to be wondered at that no notable advance in science is recorded of this period. Rather is it a matter for wonder as well as congratulation that what had been accomplished was so well preserved by obscure scholars here and there, and particularly among the Saracens. Indeed, it is to the East that we must look once more for intellectual development, in the Byzantine countries and among the Arabs, where universities were founded and where the newer Christian-Oriental ideas blended with those of the Roman-Hellenic culture. Sergios von Resaina (536) translated the works of Hippocrates and Galen into Syrian; and the names of Oreibasios and Avicenna are also prominent in what is sometimes called the Arabic period of medical history.

The Renaissance brought with it the same renewal of activity and dissemination of knowledge in medicine that it did in other sciences, and schools were founded throughout Europe. Salerno, Naples, Montpellier, Venice, Bologna, Prague, Vienna, and Oxford all shared in this awakening; and students traveled from one university to another in order to acquire all the knowledge they could give. The great names of this period begin to be more familiar to modern ears, and their work to seem more immediately connected with modern thought. Some of those names are: Lisfranc (1295); Mondino de Luzzi (1275-1327), who was the author of the first anatomy written since the time of Galen; Linacre (1461-1524), to whom Oxford and Cambridge were indebted in a large measure for their early share in the results of the Renaissance; and Sylvius or Jacques Dubois of France, who was the first to arrange all the muscles of the human body, and who assigned them names which are largely in use at the present time. It was, however, his pupil, Andreas Vesalius (1514-1564) who "brought into anatomy the new spirit of the time." Whereas Dubois, even while making dissections, had followed the treatises of Galen with almost servile

devotion, Vesalius accepted no tradition, but went straight to nature itself for his facts, thus justifying the description which has been applied to him of "founder of modern biological science." Among Vesalius's contemporaries were many almost equally notable physicians, among them Eustachio, who pointed out the value of embryology in the interpretation of gross anatomy and made some important contributions to the knowledge of the ear, as did also Fallopio. Discoveries in the field of anatomy were the order of the day. Servetus, a Spaniard, made out some new facts concerning the pulmonary circulation; Cesalpino wrote on the circulation of the blood; Varoli contributed to the knowledge of the nervous system, and Spigelius to that of the liver. Realdo Colombo, who succeeded Vesalius as professor of anatomy at Padua, and later held the same position at Pisa, correctly described the pulmonary circulation, although, as some maintain, without an adequate realization of the bearing and interpretation of his discoveries.

It was at Padua that Fabricius (1537-1619) built an anatomical amphitheater, where William Harvey became one of his pupils. Thus at last we come to the man who could correlate the new discoveries in the structure of the human body with new and illuminating ideas as to function, linking anatomy and physiology in a workable union. It was in 1615 that Harvey demonstrated the action of the heart and correctly interpreted the history of the circulation of the blood. His work was supplemented four years after his death by Malpighi, one of the first to employ the microscope in his investigations, who in 1661 successfully observed not only the capillaries, but the capillary circulation, in the lung of a frog.

The seventeenth century was also signalized by marked advances in the physiology of nutrition and secretion, made by Van Helmont, Wirsung, Wharton, Peyer, Brunner, Glisson, Malpighi, Bellini, Aselli, Pecquet, Rudbeck, Van Horne, and De Peiresc, a list of names which gives some idea of the activity of the time, although space is lacking to note the distribution of their various discoveries. In 1614 the Italian physician Santorinus published his "*Ars de Statica Medica*," in which appear the beginnings of the study of general metabolism. Borelli (1608-1679) turned his attention to the mechanics of bodily movements, and the physiology of respiration was ably contributed to by Boyle (1626-1691), Van Helmont, Mayow (1645-1679) and Hooke (1635-1703). In the latter half of the century the anatomy of the eye was carefully studied by Ruysch and Leeuwenhoek; and the results of their studies, together with those of Keppler, Scheiner, Descartes and Mariotte concerning the function of that organ, resulted in establishing the fundamental principles of physiological optics. Vieussens, Duverney, Schnellhammer, Glaser, Folli, Manfredi, Perrault, and others did as much for the structure of the ear.

The physiology of generation also came in for investigation, the observers

being divided into two opposing parties, the "ovists" who followed Harvey and Fabricius, and the "animalculists" who adopted the theory constructed by Leeuwenhoek after the discovery of spermatozoa—termed by him "animalcules"—by his pupil Von Hammen. The structure of the generative organs was studied also by Highmore, De Graaf, Swammerdam, Needham, Drelincourt, and Hoboken.

In the nineteenth century the progress of medicine was so marked and striking, that what went immediately before seems of small moment in comparison. Yet real advances had been made previous to that date, and in some cases later and more considerable achievements had been foreshadowed. Early in the eighteenth century Boerhaave of Holland had wrought a revolution in clinical observation, and a little later the Italian Morgagni who, in the words of Virchow, "introduced anatomical thinking into medicine," did a service to pathology which was duplicated in the field of physiology some years later by Haller of Germany. John Hunter, too, had brought forward improvements in operative surgery, and turned the attention of the profession to research in anatomical and physiological fields.

Yet, in spite of the great names of that period, the eighteenth century remained under the sway of strange theories, born of guesswork and misunderstood or careless observations. William Cullen (1710-1790), whose life extended practically over the century, discarded the antiquated theory of "humors" and made the nervous system the seat of disease; while his pupil, John Brown, classified all diseases as either sthenic or asthenic, the former to be treated by depletion as due to overexcitation, and the latter to be treated by stimulation as due to underexcitation. Hahnemann, in his turn, scouted all theories, and averred that beyond symptoms our knowledge can not go, that hidden pathological changes are quite beyond its ken, and that the best we can do is to remove the symptoms, a process which, to his belief, implied also the removal of the disease. This exaltation of empiricism was an obvious reaction against the baseless theorizing which had preceded it, and a further reaction against the enormous and often injurious doses which had been wont to be administered was evidenced in Hahnemann's insistence, that in order to possess healing-power the dose must be too small for recognition by the senses or by chemical analysis. These ideas, together with Hippocrates's "law of similars," constitute the beginnings of homeopathy, although what is known by that name to-day differs in many details from what its founder intended the word to convey. See HOMEOPATHY.

But neither unrelated theories nor unreasoning empiricism was destined to satisfy the nineteenth century. Bichat, at the very threshold of that century, published his epoch-making work on general anatomy, in which he pointed out that since the organs have tissues and membranes in common,

the seat of disease was this common tissue rather than the organs considered individually. This work of Bichat vastly simplified physiology and anatomy, both normal and pathological, and colored the work in the latter field done by the followers of Morgagni. Broussais's works (published in 1808 and 1816), which were based upon the sthenic and asthenic theory of Brown, stimulated research in similar fields; and the investigation of local ailments was greatly aided by the introduction of percussion and auscultation by Auenbrugger of Vienna and Laennec of Paris, the latter of whom is known to fame as the inventor of the stethoscope and as the founder of modern clinical science. One of the familiar names of the early nineteenth century is that of Richard Bright, the investigator of kidney-diseases; and a number of observers of France, Scotland, England, and America did valuable work in the study and discrimination of the continued fevers.

In America, indeed, the nineteenth century was signalized by a phenomenal development of medicine. At the beginning of the century there were only three medical schools in the United States, and but two general hospitals. Medical students who could not afford to go abroad to Paris, London, or Edinburgh studied privately with some physician near their homes. The rapid growth in population demanded an increase in facilities for medical service greater than legitimate channels could supply, and although medical schools sprang up with amazing rapidity many of them turned out a product scarcely better than the frankly uneducated. But though the ignorant might be satisfied with such service, the large number of intelligent people in the country would not put up with it, and all the schools of the better sort, with Harvard in the lead, set up higher standards which the increasing development of medical knowledge has never suffered to lapse, but has compelled rather a more and more exhaustive training.

The latter half of the century has seen the development of the research laboratory, the triumphs of bacteriology, and the dawn of the era of preventive medicine. Even to the laity these triumphs are more or less familiar. The names of Pasteur, Koch, and Lister are household words; and some knowledge of the part played in human lives by bacteria, pathogenic and non-pathogenic, is reaching the general population and making possible the great campaigns being organized against the most threatening of infectious diseases. The germs of many of these diseases have been successfully isolated; and even where this has not yet been achieved, as in the case of smallpox, some knowledge of their action may make intelligent and effective prophylaxis possible.

The discoveries of bacteriology gave rise to the serum-treatment, which has already accomplished so much and promises so much more. Diphtheria, for instance, has had its mortality reduced one-half by this means. The conditions under which the various disease-germs thrive, and those which are necessary for their transmission, have been investigated; and



PLATE XIII.

Fig. 1. CALCULI OF THE BLADDER

- a. Oxalic acid calculus
- b. Phosphoric acid calculus
- c. Uric acid calculus

Fig. 2. VARIOUS GALL-STONES



Fig. 3. FECAL CALCULUS IN APPENDIX
(Ulcerating through wall)

Fig. 4. VARIOUS FECAL CALCULI

the seat

PLATE XIII.

Fig. 1. CALCULI OF THE BLADDER

a. Oxalic acid calculus

b. Phosphoric acid calculus

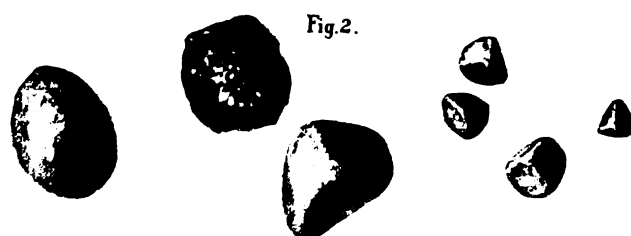
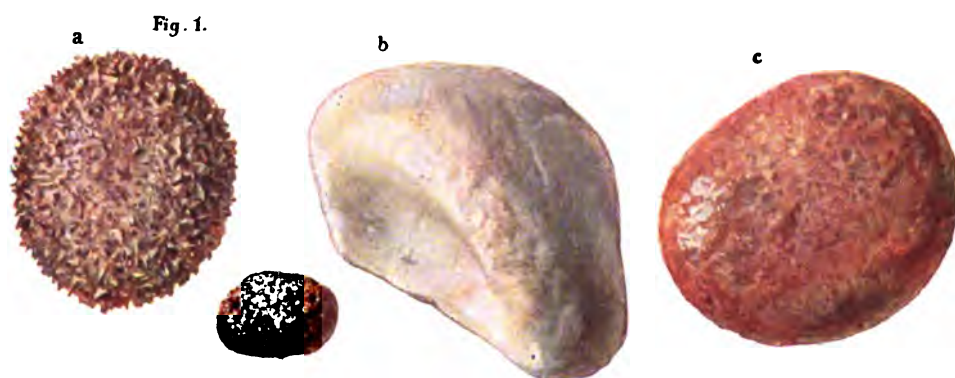
c. Uric acid calculus

Fig. 2. VARIOUS GALL-STONES

Fig. 3. FECAL CALCULUS IN APPENDIX

(Ulcerating through wall)

Fig. 4. VARIOUS FECAL CALCULI



the removal of such conditions has made it possible to control, not only diphtheria and smallpox, but many other diseases which formerly appeared in epidemics that justly won the epithet of "scourge." Among these are bubonic plague, Asiatic cholera, typhus, typhoid, and yellow fever; and earnest "campaigns of education" may yet make it possible to do as much with regard to tuberculosis and syphilis.

Another change wrought by the modern understanding of the nature of disease is in the therapeutic methods employed by the medical profession. Where the physicians of the early half of the nineteenth century put all their faith in the efficacy of drugs, the modern physician, while not discarding their aid, still realizes more intelligently their limitations; and while studying with painstaking care the action of those drugs which have proved of value, he depends more and more on the regulation of the patient's manner of living, on diet, bathing, exercise and massage—in short, on everything that can give the natural powers the best chance in coping with the disease. Even the general public is beginning to appreciate the new point of view, and patients are found who do not refuse to believe that they are getting their money's worth when the doctor gives them nothing to "take" except advice.

A glance at the recent developments in medicine would be quite incomplete did it omit to notice the prominent part played by mental representations in provoking and fostering, and likewise in curing, disease. Physicians of prominence, in Europe as well as in America, are giving this subject keen and serious attention; and the cures wrought by "psychotherapeutics" can no longer be regarded as based on ignorance and superstition. The principles applied indiscriminately and unintelligently by "healers" of various sorts are capable of scientific application as well.

Altogether, the story of the development of medicine, especially in its later chapters, is a hopeful and inspiring one. The mere fact that the average working life of English-speaking men is twice as long as it was three centuries ago, speaks eloquently for the advance of hygiene. And with the hope that the public may be educated to the point of pushing to its limit all that is implied in the modern watchword *prophylaxis*, one hesitates to foreshadow what may be the achievements of the next three centuries.

MEDICINES.—Substances administered in the treatment of diseased conditions. Such remedies are derived from either of the three natural divisions, or kingdoms: the animal, the vegetable, and the mineral. Many of these medical substances exert an injurious effect on the healthy organism when given in large doses; in other words, they act as poisons to the system unless carefully administered. When prescribed by a physician in a condition of disease, the doses and preparations are, however, so carefully regulated that the action of an otherwise poisonous drug is limited within its beneficial effects on the morbid process present. While no drug is able

to restore strength and vigor to a generally debilitated body, there are many pharmaceutical preparations that are highly valuable in their local effects on certain organs or tissues. The following tables give the names of some of the most popular drugs, grouped according to their therapeutic effects. Since the same disease hardly ever occurs with like manifestations in any two individuals, expert diagnosis is always necessary in order to determine the correct mode of treatment. And since dosages must needs be regulated according to the requirements of each individual case, being dependent upon a great many factors, it would be absolutely useless—even productive of harm—to attempt giving any directions for self-treatment. Moreover, the drugs that are most efficacious are usually poisonous when given in doses that are not accurately balanced to meet the existing symptoms; and for this reason the laws of all civilized countries forbid the pharmacist to dispense such drugs to any persons other than licensed practitioners. The lists are merely presented to give the reader some idea as to the variety of aids at the physician's disposal.

ALTERATIVES

Ammonium chlorid
Arsenic and iodid of mer-
cury
Arsenious acid
Chlorid of calcium
Colchicum

Creosote
Guaiacol
Ichthyol
Iodides
Iodoform
Iron

Manganese
Mercury
Potassium chlorate
Sulfur
Zinc salts

ANESTHETICS (General)

Chloroform

Ether

Nitrous oxid (laughing-gas)

ANESTHETICS (Local)

Cocain
Ether (by freezing)

Ethyl chlorid
Ice

Menthol

ANODYNES

Acetanilid
Aconitin
Antipyrin
Atropin

Camphor
Chloroform
Codein
Heat

Morphin
Phenacetin

ANTIPYRETICS

Acetanilid
Aconite
Ammonium acetate

Benzoic acid
Cold
Phenacetin

Quinin
Veratrum

ANTISEPTICS

(See list on page 141)

ANTISPASMODICS

Amylene hydrate
Amyl nitrite
Atropin
Bitter-almond water
Bromides
Camphor

Chloral hydrate
Chloroform
Ether
Hyoscyamus
Morphin
Musk

Nitroglycerin
Opium
Stramonium
Valerianate of zinc

BRAIN STIMULANTS

Amyl nitrite
Belladonna
Caffein

Camphor
Cocain
Strychnin

Volatile oils in general

CATHARTICS

Aloes
Calomel
Cascara sagrada
Castor-oil
Croton-oil

Epsom salt
Gamboge
Glycerin
Jalap
Magnesium salts

Rhubarb
Rochelle salt
Senna
Sulfur

DIGESTIVES

Hydrochloric acid
Malt

Pancreatin
Pepsin

DIURETICS

Acetate of ammonium
Caffein
Calomel
Copaiba
Digitalis

Juniper
Lithium
Pilocarpin
Potassium salts
Santal-oil

Sodium nitrate
Squills
Sweet spirit of niter

EXPECTORANTS

Ammonium salts
Antimony salts
Balsam of Tolu
Benzoic acid

Iodid of potash
Ipecac
Licorice
Pilocarpin

Squill
Tar
Turpentine

HEART STIMULANTS

Adrenalin
Ammonia
Atropin
Caffein

Digitalis
Ether
Nitroglycerin
Oxygen

Squills
Strophantus
Strychnin

INTESTINAL ASTRINGENTS

Acetate of lead
Bismuth salts
Blackberry
Catechu

Krameria
Lactic acid
Nitrate of silver
Opium

Tannalbin
Tannic acid

HYPNOTICS

Acetanilid
Amylene hydrate
Bromides
Chloral hydrate

Codein
Hyoscyamin
Morphin
Opium

Paraldehyde
Sulfonal
Trional
Veronal

NERVE SEDATIVES

Acetanilid
Amyl nitrite
Antipyrin
Bromides
Camphor

Chloral hydrate
Chloroform
Codein
Hyoscyamus
Paraldehyde

Scopolamin
Sulfonal
Valerianates

RESPIRATORY STIMULANTS

Atropin
Caffein

Cocain
Strychnin

STIMULANTS TO BILIARY PASSAGES

Aloes
Amyl nitrite
Arsenic
Benzoic acid

Bicarbonate of soda
Calomel
Chlorid of ammonium
Jalap

Podophyllin
Salicylate of soda
Sulfate of soda

STYPTICS

Acetate of lead
Alum
Antipyrin
Gallic acid

Iron salts
Nitrate of silver
Sulfate of copper
Sulfate of manganese

Tannic acid
Turpentine
Wich-hazel

SUDORIFICS

Aconite
Camphor
Citrate of potash
Dover's powder

Ether
Nitrate of potash
Nitrate of soda
Opium

Pilocarpin
Sweet spirit of niter
Veratrum

TONICS (General)

Arsenious acid
Bismuth salts
Bitters

Cod-liver oil
Eucalyptus
Ichthyol

Iron preparations
Manganese
Mineral acids

VERMIFUGES

Aspidium
Chenopodium
Oil of turpentine

Pumpkin-seed
Quassia
Santonin

Spigelia
Thymol

It is very important that patients should observe the physician's instructions with regard to the proper time for taking the medicine prescribed. Some drugs are to be taken before meals, others after meals; some in the



FIG. 276. Gelatin wafer for powder.



FIG. 278. Poison label.

FIG. 277. Powder-syringe.
a. tube; b. rubber balloon.

FIG. 280. Medicine spoon of porcelain.

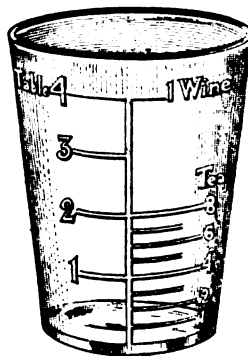


FIG. 279. Graduated glass.

morning on an empty stomach, others in the evening at a stated time before retiring. In all cases the physician should advise the patient, and the latter must carefully follow instructions.

Medicines may be prescribed either in solid or in liquid form. Solid drugs are usually administered in the form of powders, pills, or tablets; liquids as infusions, simple solutions, tinctures, etc. If a prescribed powder has no unpleasant taste, it may be taken by depositing it on the tongue and washing it down with a swallow of water. If its taste is bitter or nauseating,

it is usually put up in capsules or wafers (Fig. 276) made from gelatin. Pills are generally coated with gelatin, sugar, or chocolate, to disguise their taste and render it easier to swallow them. Powders for external use may be applied with a tuft of cotton; or, if they are to be applied on a mucous membrane (throat, vagina, etc.), a powder-syringe as shown in Fig. 277 may be used. Liquid remedies are put up in bottles which bear labels containing directions for taking. Liquids for external use are conspicuously labeled to guard against mistake; and poisonous remedies are put up in bottles bearing a red label with the word "Poison" flanked by skulls and crossbones (see Fig. 278). The dose of a liquid is usually indicated by the teaspoonful (1 dram), dessert-spoonful (2 drams), tablespoonful ($\frac{1}{2}$ ounce), or wineglassful (2 ounces). A graduated glass (see Fig. 279) is useful for obtaining the accurate measure. If the dose is indicated by drops, a drop-



FIGS. 281, 282. Dropping-bottle and how to use it.

ping-bottle (see Figs. 281, 282), which permits only a drop at a time to flow through the perforated glass stopper, is useful.

MELANCHOLIA.—See INSANITY; MENTAL DISEASES.

MENINGITIS.—An inflammation of the meninges, the lining membranes of the brain and upper portion of the spinal cord. Meningitis is not a single disease, the name being used solely to indicate a number of different forms of infection of the membranes of the brain, presenting symptoms which are more or less similar. Thus, it is well established that infection by means of the tubercle-bacillus causes tuberculous meningitis, and infection by the typhoid-bacillus, typhoid meningitis. The bacillus of influenza and the infectious organisms of syphilis may also cause inflammation of these membranes; while certain definite kinds of infection are known to bring about specific types of meningitis. Thus, epidemic cerebrospinal meningitis is known to be produced by a specific organism.

The greater portion of the forms of meningitis observed are usually tuberculous in their nature; especially is this true for meningitis which occurs in children. The usual symptoms of tuberculous meningitis, as found in children, are more or less characteristic. As a rule children whose

parents are tuberculous, or who live in contact with consumptive persons, are more liable to the disease. In some cases it is observed that the child gradually fails in health; in others the symptoms are first noticed when the child, after an attack of measles or whooping-cough (rarely after a severe fall), commences to grow restless and irritable, loses its appetite, grows thin, and begins to show signs of suffering from headache. The child frequently puts its hand to the head, and often starts while sleeping, or wakes suddenly with a sharp, high-pitched scream. At this time constipation is usual, and irregular variations in temperature develop.

The disease usually progresses. Vomiting may be present or may have ceased. The child is dull and apathetic, and frequently lies with the head drawn back upon the pillow. The pupils, which have heretofore exhibited a tendency to show like pin-points, become dilated. They may be irregular, and not infrequently the child commences to develop a squint. Convulsions occur, which may be localized in one portion of the body, but are more apt to be generalized. The temperature still remains more or less abnormal, ranging from 100° to 103° F. From this stage the child passes into a state of paralysis. Unconsciousness becomes more marked, the child can be aroused only with difficulty, and spasms are very frequent. Diarrhea usually sets in, the pulse becomes frequent, the tongue is coated, and the child sinks into a state of mild delirium, with involuntary passing of urine and feces. The whole aspect of the child is one of hopelessness.

Occasionally tuberculous meningitis advances very rapidly, the child dying in four or five days, or in a couple of weeks; and it is this form which is so frequently confused with epidemic cerebrospinal meningitis, especially when that disease is more or less prevalent. The only sure method of making a diagnosis between this form of meningitis and epidemic cerebrospinal meningitis is by means of a puncture of the spinal cord in the lumbar region, and the microscopical examination of the fluid which is withdrawn. The more common form of tuberculous meningitis, however, runs a more chronic course, and the entire duration of the disease may extend from four to six or even eight weeks. Occasionally patients are seen who have been sick several months. As a rule most of these children die.

Epidemic cerebrospinal meningitis, or cerebrospinal fever (known also as *spotted fever* and as malignant *purpuric fever*), is an infectious disease due to a specific bacterium, the *Diplococcus intracellularis*. The disease has been known for many years, and its first appearance in the United States is supposed to have been described by Drs. Danielson and Mann as having occurred in Medford, Mass., in 1806. Since that time many epidemics have occurred, which have spread throughout the United States. Thus, from 1805 to 1830 the disease was very wide-spread. From 1837 to 1850 the disease occurred here and there throughout the United States, but was very common in France. A number of severe epidemics occurred in the

United States between 1854 and 1874; and since 1890 the disease has again been epidemic throughout the country.

The symptoms of cerebrospinal meningitis of the ordinary form usually commence abruptly, the patient as a rule suffering from headache, severe chills, pain in the back, and vomiting. Stiffness of the back of the neck, attended with pain on moving, is often noted in the early stages. As the patient grows sicker the headache continues, excessive sensitiveness to noise and light develops, and the patient becomes very restless and peevish, particularly if it is a child. The pains in the back become more severe, and the painful condition in the back of the head and the associated rigidity of the muscles may at times become so pronounced that the patient lies in a very stiff, restrained, and constricted position, with the head drawn back. Spasms of the muscles, or even convulsions, may be noted as early as the third or fifth day. Occasionally paralysis of the ocular muscles develops, and the patient becomes cross-eyed early in the disease. The temperature is likely to rise suddenly and steadily (105° to 106° F., or even higher), and the pulse is apt to be rapid and feeble, especially in children; adults, however, may show a slow pulse. During the early course of the fever an eruption may occur which is reddish in color and somewhat resembles measles, although usually not as widely nor as closely distributed. Occasionally the spots resemble typhoid rash, and in some instances rare forms of skin eruption have been observed.

The course of the disease is extremely variable. It may be very rapid, as in the malignant form, the patients dying in from twenty-four to forty-eight hours. Some cases are on record in which the patients died within ten hours after the onset of the symptoms. In other cases the patients may linger for months before the fatal issue; or they may recover after several months of illness, with symptoms of marked defect on the part of the nervous system, such as blindness, deafness, paralysis of one or both limbs, or some other severe affection.

The death-rate varies considerably according to the virulence of the epidemic. At times as many as 75 per cent. of the patients die; at other times only 15 to 20 per cent. In children the disease is generally more severe than in adults. Unfortunately, apart from careful nursing in the open air, little can be done with the knowledge at present at the command of the physician, although of recent years a number of surgical procedures have been tried with good results at times. Diphtheria antitoxin has been employed, and other means of treatment suggested, but up to the present time there is no royal road of treatment for this severe affection.

A form of meningitis which is by no means uncommon is that which follows suppurative inflammation of the middle ear. Here the ordinary pus-forming bacteria are responsible for the inflammation of the meninges, and while the symptoms are similar in kind to other forms of meningitis, they

usually show a much more acute form of the disease. Thus, high fever, raving delirium, and symptoms of severe infection are characteristic. In this form of meningitis the proper treatment is surgical, and prompt opening of the skull with free evacuation of the local pus-collection, if present, often results in recovery.

MENOPAUSE.—Term applied to the time of life when menstruation ceases. This usually occurs at about the age of forty-five. While the “change of life” is taking place menstruation is sometimes very profuse, but in other cases it may be entirely suspended for months. In its place floodings may appear. The belief that excessive menstruation is a normal symptom of the menopause, works much mischief. The symptom is always indicative of disease, and is frequently the result of malignant tumors. In order that such tumors may be discovered and removed in time, every elderly woman who suffers from too frequent menstruations, or from excessive discharges, should undergo medical examination, especially if a hemorrhage appears after the periods had been absent for years. The non-appearance of a menstrual period may be caused by a tumor of the ovaries. Cessation of the menses, when accompanied by abdominal pain and distention, therefore necessitates medical examination. As a general rule, the cessation of the menstrual periods is unimportant; and in women who live healthy lives, do not indulge in too much coffee, and have plenty of physical exercise, this change takes place without the slightest discomfort. This fact is contrary to the wide-spread superstitious belief, that the blood left in the body may “rise to the head” and cause “mental disturbances.” Women should be especially warned against remedies supposed to excite menstruation.

MENSTRUATION.—A periodical hemorrhage from the uterus of the mature female, occurring every four weeks. During pregnancy and lactation menstruation is absent. It appears for the first time at about the fourteenth year, and ceases at about the forty-fifth year of life. Each menstrual discharge extends over a period of from three to five days, and the blood passed amounts to between five and ten ounces. Menstruation is usually accompanied by slight pains, general depression, and irritability; hence, being “unwell.” The process of menstruation starts in the ovaries. Every twenty-eighth day an ovum is detached from the ovaries, and passes into the Fallopian tubes. It then passes into the uterus, which is engorged with blood and physiologically ready to support the fetus should the ovum become impregnated. Menstruation does not take place if the ovaries are removed in their entirety.

The character of menstruation depends upon the climate, the occupation, the general health, and on psychic effects. The women of Greenland, for instance, rarely menstruate in winter; women that work in the fields in summer have little menstruation during this season; girls from

the country often cease for a time to menstruate in the cities; and in persons who are suddenly called upon to perform difficult mental work menstruation also frequently ceases temporarily. City-bred women as a rule menstruate more profusely than countrywomen. Fright and excitement may suppress menstruation or produce it at irregular times. Chlorosis and exhausting diseases cause a temporary loss of menstruation; and such a temporary cessation is not, as believed by many, the cause of these affections, but the consequence. The onset of menstruation, as well as its cessation, is often associated with disturbances. Periodic pains often precede the beginning of menstruation; and in some cases the first menstruation may set in with violent pains, or it may persist a long time, or be very profuse. During the change of life menstruation frequently is very profuse, but it may also be suspended for months. In the latter case women suffer from rush of blood to the head, sensations of heat over the entire body, palpitation of the heart, sudden perspiration, etc.; and these disturbances usually persist for one or two years after menstruation has ceased.

Depending on the condition of their health, women may be able to continue their usual occupations during their monthly periods, but they should omit unusual or great exertions, such as dancing, swimming, etc. To absorb the blood a so-called "monthly napkin" is worn. Absorbent gauze is the best material for this purpose. Lukewarm baths may be taken without harm; nor will irrigations be harmful provided they are made with a clean instrument and an antiseptic solution. At the close of a menstrual period it is advisable to take a warm bath, and to resume the daily washing of the entire body. The use of medicines need not be interrupted during menstruation unless the physician gives different directions.

For all disturbances of menstruation a physician should be consulted; and domestic remedies should never be used. There are no remedies which produce, suppress, or delay menstruation. Disturbances attending the onset or the termination of menstruation may often be relieved by general hygienic measures, such as rubbing with cold water, regular exercise in fresh air, gymnastic movements, suspension of mental work, and attention to the regular discharge of urine and feces. An examination by a physician is indispensable if the flow is too profuse or lasts very long. When pains which grow more violent from month to month occur in young girls, without the appearance of the menstrual flow, an examination is required in order to determine whether or not an occlusion of the hymen or of the womb may be present. See *Tumors of the Womb*, s.v. WOMB, DISEASES OF.

MENTAL DISEASES.—General term for affections of those portions of the brain which are connected with mental processes. Insanity, therefore, is as truly a bodily ailment as is pneumonia, diphtheria, or cancer of the stomach. All other explanations, which in part result from entirely imaginative conceptions, are unsatisfactory. A mentally deranged person is

neither "possessed by a demon," as was assumed in the middle ages, nor "swayed by an unnatural passion." Neither is insanity a "consequence of sin," as was asserted by moral philosophers of a hundred years ago. The period of executions for witchcraft, to which many unfortunate demented persons fell victims, is now gone by; and the moral contemplations regarding the nature of mental disturbance are now found only in novels, upon the stage, and among ignorant people. Science recognizes only this, that an insane person is a patient; and it is necessary always and constantly to point to this simple truth, which constitutes the foundation upon which are based the judging and the treatment of insanities. Although investigators have not yet succeeded in demonstrating morbid changes in the brain in every form of mental disturbances, still such pathological alterations are known for the majority of mental maladies. Scientific knowledge in this respect has been greatly increased, particularly during the last ten years.

The causes of the insanities, as those of disease in general, are divided by alienists into two groups: internal and external ones. The internal causes are based upon the psychicomental constitution of man. The human constitution is largely inherited; to a smaller extent it is acquired. Heredity, therefore, becomes a prominent factor in the causation of mental diseases. The brain of a person with an "inherited taint" is constructed somewhat differently from that of a normal brain; it is usually more susceptible to disease, more vulnerable psychically. External harmful influences (faulty education, mental emotions, abuse of alcohol, etc.) may cause the inherited susceptibility of such a brain to become manifest. More than half of the mentally diseased are hereditarily tainted. Transmission is apt to take place in a direct line; that is, from the parents to the children. Sometimes, however, one generation may remain unaffected, the disease of a grandparent being inherited by the grandchildren. The predisposition to mental derangement may be inherited, not only by the descendants of insane persons, but also by the children or grandchildren of nervously affected individuals, of persons addicted to alcoholic excesses, and of epileptics. Conversely, the children of mentally deranged persons may become subject to nervous diseases, to epilepsy, or to dipsomania. The children of syphilitic parents are frequently born weak-minded. The enormous influence of heredity emphasizes the importance of a rational selection in marrying. It is possible that three-fourths of all insane asylums could close their doors if it were possible to regulate marriage in accordance with hygienic principles.

The deleterious effects of intermarriages among blood-relations are somewhat overrated. If the individuals contracting marriage be perfectly healthy, there is little cause for alarm. In most families, however, there are slight deviations from average conditions, insignificant nervous disturbances, or peculiarities of character; and in such cases continued inter-

marriages often result in doleful consequences. Entire lines of princes and nobles have perished in this manner.

Among the external causes leading directly to mental disease, psychic emotion is one of the most significant. Persistent exertion of the mind along the same channels, even overexertion, will scarcely be followed by harmful consequences; it becomes injurious only when associated with severe mental emotion, such as great responsibility, disappointed ambition, dissatisfaction, or constant worry. A scholar living a life free from care need apprehend less, in spite of assiduous mental activity, than a laborer who is never without serious worry concerning his daily bread. Mental emotions are disastrous because they destroy the appetite and; what is worse, cause insomnia, thereby exhausting the body and affecting the very finely constructed nervous tissues. An inappropriate mode of living, debauchery, and, above all, alcoholic abuse, increase the danger still more. Mental disturbances resulting from severe bodily diseases (such as typhoid fever, scarlatina, or consumption) or following a debilitating childbed, may be explained on the ground of continued exhaustion. On the other hand, acute mental excitements, such as fright, rarely cause aberrations of mind. Nor should the danger of mental infection from constant intercourse with insane persons be overestimated. This danger only threatens persons of a nervous predisposition. Alienists and nurses of the insane are no more subject to become mentally deranged than are other persons. On the other hand, there are some forms of imitation, as is seen in mental epidemics in times of great nervous excitement and exaltation. See ST. VIRUS'S DANCE.

Certain poisons exert destructive action upon the nervous system and upon the brain. These include morphin and cocain, the habitual use of which leads to the terrible conditions known as morphinism and cocainism. Syphilis is, however, of much greater practical importance. This disease, which may be inherited or acquired, is one of the chief causes of the much-dreaded and very frequent form of insanity known as general paresis. See BRAIN, SOFTENING OF.

Alcohol is the most reliable contributor to the insane asylums, for not only is the inebriate rendered insane by it, but its curse is transmitted to his offspring. No disease (and inebriety must be thus designated) exerts an equally deleterious influence upon the succeeding generations. At least one-third of all insane and idiotic persons have become so because of the abuse of alcohol, either on the part of themselves or on that of their parents.

Mental disturbances may arise also in connection with other affections of the brain and of the nervous system. Attention may be directed to the deteriorations following cerebral apoplexy, injuries to the skull, tumors of the brain, and epilepsy; as well as to those resulting from hysteria and "nervousness," which might be designated as affections intermediate between nervous and cerebral diseases.

That mental affections are on the increase is frequently being asserted, and this is ascribed to the nerve-destroying life of modern times. The truth of this contention, however, has by no means been proved. It is true that there are more insane asylums to-day than there were formerly, but this increase may be readily explained by the fact that very many patients are now admitted to insane asylums who formerly remained with their families, or who were cared for in poorhouses or in hospitals. In considering this question, the modern, and more exact methods of census-taking must also be taken into account; nor must the fact be ignored that the inmates of the asylums attain a higher age nowadays as a result of better treatment and care. Harmful influences unquestionably result from the greater nervous strain demanded by modern conditions—the general competition, the increasingly difficult struggle for existence, the pursuit of earthly blessings and sensual pleasures, etc.—but these are fully counter-balanced by the vastly better material conditions of the present day. To prove this contention it is sufficient to compare our dwellings, dress, food, water-supply, the methods of fighting epidemics, etc., with the conditions prevailing during the eighteenth century.

The manifestations of mental disturbances, as well as their courses, are so varied that it is extremely difficult to define any one accurately. Furthermore, it is difficult to say when it is justifiable to speak of mental diseases. Laymen look upon these matters in a manner which is entirely unwarranted by the actual conditions. They believe a mental affection to be characterized by irrational talk and foolish acts. But when questioned as to the boundary-line between “rational” and “irrational,” they are at a loss to explain. As in the colors of the rainbow no one is able to determine where red passes into yellow, and where yellow into green, so is it impossible also for the most skilful alienist to state the exact point of demarcation between mental soundness and mental unsoundness. As the bright day gradually passes through dusk into dark night, so do many steps lead slowly from mental lucidity down to the deepest darkness of mental obscurity. These transitional stages are designated by the alienists as mental inferiority or degeneration, in contrast to mental disease. How wide the variations may be can readily be perceived by calling to mind the numerous odd characters met with in every walk of life. The eccentrics, the problematists, the unpractical dreamers, the visionaries, the congenitally weak-minded simpletons who are on the boundary-line between normal stupidity and morbid imbecility, and, finally, the habitual criminals, vagabonds, and tramps—all of these may be regarded as being more or less abnormal, although not necessarily mentally diseased in the true acceptation of the term.

Owing to their peculiarities these mentally degenerated persons are very liable to come in conflict with the law; and since mentally unsound individuals must be regarded as irresponsible, and dare not be punished, the

vast importance, but also the difficulty, of correctly estimating their mental condition becomes evident. The alienist has merely a choice between two decisions: mentally responsible, or not. The law makes no provision for intermediate conditions, such as a diminished soundness of mind. This readily explains the frequent differences of opinion between alienists and laymen, especially jurists. These divergencies are due to the fact that the legal definitions are not adapted to actual conditions, but are based upon the erroneous contention that it is possible in every instance to distinguish precisely between mental disease and mental soundness.

The onset of mental affections rarely occurs suddenly and without warning, as often depicted in novels and on the stage. As a rule they are preceded by a premonitory stage, and it is important to bear this in mind. The patient gradually becomes "different" from what he had been before. Changes in demeanor, etc., may, of course, occur also in persons who are mentally sound, but in these cases the change is based upon extraneous, pleasant or unpleasant, events. In the insane individual, on the other hand, the change usually occurs without any such reasons. The individual gradually, at first imperceptibly, develops various peculiarities of character. He may become taciturn, reserved, brooding, and anxious; he may develop a markedly cheerful disposition; he may become fickle, restless, and quarrelsome; he may grow distrustful, irritable, and whimsical; he may become tactless, careless, and indecent; or he may grow indifferent, dull, and stupid.

In many cases the true cause of this change of character is not suspected during the first period; not even in court where these patients are often summoned, owing to their mental transformation which is very liable to make them commit criminal acts. Numerous insane individuals reach the asylum every year by the roundabout road of the prison, although they were already mentally sick at the time sentence was pronounced. At that time, however, nobody thought of consulting an alienist. The patient talked quite rationally, and the natural inference of common sense was that his mind was sound. In this manner sentence is often pronounced upon innocent persons. If, on the other hand, such a patient be spared by the penal code, it often happens that he ruins himself and his family by rash deeds, senseless extravagance, or inconceivable actions. At length his peculiarities become too conspicuous to be misjudged as to their nature; or the scene is unexpectedly changed by acts of violence to others, or by suicide. Only then (too late, unfortunately) "common sense" comprehends that the excesses of a mentally diseased person were at the bottom of the previous actions. Further developments usually go on in the insane asylum or sanitarium. While they are less apparent to the laity, the progress of these diseases is important.

Laymen usually distinguish between real mental diseases and psychical affections, taking the former to be those in which the "reason has suffered,"

which would not apply to the latter. Although the entire mind is affected in every mental disturbance, it is possible for practical reasons to separate two groups of the insanities. The patient's mind may be morbidly depressed, so that he becomes morose and anxious, often tormenting himself with his morbid apprehensions. This condition is known as melancholia. An opposite condition is characterized by exuberance of spirits, by restlessness and irritability, and, sometimes, by excitement bordering almost on frenzy. Both states sometimes alternate in periods lasting weeks or months (manic-depressive insanity), the transition often occurring with surprising suddenness. Slighter disturbances of this character are frequently misjudged by the public. A third form of emotional state is sometimes observed. It is characterized by dulness, indifference, and mental inertia; and the patient rapidly becomes demented. Mental diseases are usually associated with various bodily disturbances, such as headache, sleeplessness, congestions, palpitation of the heart, oppressions, etc.

False sense perceptions, or hallucinations, are frequent accompaniments of many diseases of the mind. The patient sees hideous forms, or persons who are long since dead; or he hears abusive language and threats, which in reality were not uttered by any one; or he feels electric strokes, tastes poison in his food, or smells loathsome odors. These perceptions are by no means imaginary, inasmuch as the patient observes them as keenly and distinctly as normal individuals perceive their sense impressions. Therefore, he depends on them just as a healthy person believes in what he hears, sees, or feels. Hallucinations of hearing are most frequent. If they recur persistently, they give rise to delusions. When he hears threatening words the patient imagines that he is persecuted, or feels himself subjected to bodily torture; if the words heard are acclamatory, he imagines himself to be chosen for a high mission and to be especially favored by Providence. According to the character and frequency of these hallucinations, the patient gradually becomes helpless, timid, confused, or excited.

Hallucinations also occur in healthy individuals, especially in those who are subject to mental emotions. A frightened person, for instance, may imagine that he sees a ghost; and a person who is anxiously waiting for some one may have hallucinations of hearing voices. Religiously exalted persons sometimes have visions in which they see the gate of heaven open before them, and the mother of God descending; or they may hear the voice of the Savior. Dreams are likewise accompanied by hallucinations.

Disturbances of the activity of the will are present in psychic affections. In addition to diminution of will-power, every conceivable gradation may be found. Increased impulsion of activity may cause the patient to commit impulsive acts, which usually manifest the characteristics of morbidity by their mere senselessness. However, such a disturbance of the will is rarely an isolated phenomenon, but usually accompanies other morbid symptoms.

It was for some time assumed that a propensity to commit theft (*kleptomania*), or arson, or murder, might be present in otherwise sound persons; but this opinion is false. These persons are mostly idiots or epileptics. As already indicated, many laymen believe that an insane person is no longer capable of uttering a single sensible word, and they take it for granted that he must needs act without reason in whatever he undertakes. It is most difficult for a layman to believe in the mental inferiority of a criminal who has displayed considerable cunning in his act. But it is not quite clear why a thief who suffers from delusions should lose his hankering after theft and his cunning dexterity on that account. On the contrary, insane persons are often very clever, shrewd, and quick-witted, a circumstance which greatly interferes with their treatment. The public is always ready to think of simulation. Simulation of insanity, however, is extremely rare; and still more rarely does it remain undiscovered, as it requires not only persistence and skill, but also a thorough knowledge of its characteristic manifestations. It is by no means easy to pretend to be mentally diseased, for "there is method in madness." A contrary condition—namely, that insane persons endeavor to conceal their morbid ideas so as to be taken for mentally sound—is much more common.

The prospects of cure vary greatly in the different forms of mental affections. Patients with some types of insanity (such as general paresis) never recover; others very frequently get well. It sometimes happens that lucid intervals in the course of a disease simulate recovery. Such apparent cures, lasting weeks or months, occur occasionally even in softening of the brain, which is an absolutely fatal disease. The "successful cures" of quacks can be readily explained in this manner.

The postulate "prevention is easier than cure" holds good also in mental affections. Great care is necessary in those who are hereditarily tainted. It frequently happens that a very young child displays various peculiarities of character, such as vivid imagination, ready impressionability, senseless manifestations of rage alternating with sentimental tenderness, romantic fancies, egotism, and untruthfulness; and all these qualities are often associated with so excellent talents that the parents are proud of their "prodigy of a child." But the fate of these prodigies is often sad enough. Owing to their lack of mental equilibrium and strength of character, they rarely accomplish anything worth mentioning. Mental and physical hygiene, calm perseverance in education, a rational division of work and recreation, avoidance of mental emotions and overexertions of a brain which requires rest—the precepts are so numerous, or, rather, they are so dissimilar, that they must needs be adapted to each individual case. It is important, under all circumstances, to bear in mind that one is dealing with abnormal characters, and that it is necessary to consult a physician as early as possible. Nerve specialists are usually consulted after the damage is irremediable.

The care of insane persons is often regarded as equivalent to their confinement in insane asylums; yet scarcely more than fifty per cent. of all insane persons are in such institutions. When the home conditions are favorable, a harmless demented patient may remain with his family, although caution is necessary also in such cases. A very troublesome or dangerous patient, however, must necessarily be placed in an institution. In such institutions the patient is better protected; and experience has taught that, with constant supervision by a physician, and with trained attendance, the prospects of recovery are far better than they would be if the patient were kept at home. Under no circumstances should one wait until the unfortunate patient has become demented. Hundreds of patients could have been cured if they had been placed in a sanitarium in time. The modern institutions for the insane are not prisons, but hospitals in the truest acceptance of the word. A patient should never be brought to the hospital by cunning or by deception. The majority of the mentally afflicted are quite willing to follow if one insist calmly and firmly upon their going; and, at worst, force is always better than deception. Until the patient is admitted, he should not be left without supervision, neither day nor night.

It should be borne in mind that a mentally deranged person is actually ill, and that a diseased brain can be cured neither with moral advice, admonitions, or punishments. The nervous system requires rest, bodily as well as mental. This forms the basis of all treatment. That even to-day demented persons are exorcised, as being "possessed by demons," is a fact which, unfortunately, can not be denied. There remains only the comforting knowledge that such aberrations are not in the long run capable of arresting the victory of truth. For the various forms of mental deterioration, see IMBECILITY, and INSANITY.

MENTHOL.—A stearoptene, or camphor-like substance, derived from the oil of peppermint. It occurs in colorless crystals, slightly soluble in water, but easily soluble in alcohol, ether, or oil. It has a strong odor of peppermint. Applied locally menthol is an anesthetic, and produces a comforting sense of coolness. A menthol-pencil often gives great relief when rubbed over a neuralgic area or an aching head. Applied to any mucous membrane, menthol contracts the blood-vessels, thus relieving congestion. Inhaled, or sprayed into the nose, it clears the air-passages when they are congested and obstructed. It is used also in solutions for throat sprays. Internally, menthol is used in one grain doses in certain forms of dyspepsia, and in the vomiting of pregnancy. An overdose causes severe headache and great abdominal pains with collapse.

MERCURY-POISONING.—This type of poisoning is most frequently brought about by taking corrosive sublimate into the mouth, either by accident or by design. In the form of tablets this substance is extensively used for disinfection and for antiseptic purposes. Mercury-poisoning may, how-

ever, result also from careless handling of any other mercury salt, or even of metallic mercury. When sublimate tablets are prescribed, they must be carefully kept, so that children can not find them. The symptoms of acute poisoning are constriction and pains in the throat and in the gullet; difficulty of swallowing; vomiting of bloody, mucous, shreddy masses; very painful colic; and painful, thin, often bloody, stools, with frequent desire



FIG. 283. Child suffering from micromelia.

to defecate. The patients become weak and chilled, and are covered with cold sweat. Death often occurs with convulsions. If the course is protracted, additional symptoms appear on the second or third day. These are salivation, inflammation of the readily bleeding gums, ulcer formation, and a putrid odor from the mouth. Until the physician arrives the patient should be given emetics, and large quantities of milk and the white of eggs.

Chronic mercury-poisoning, the causes and symptoms of which are described in detail in the article on OCCUPATION DISEASES, requires careful treatment by a physician.

METRITIS.—See WOMB, DISEASES OF.

MICROMELIA.—A congenital deformity principally characterized by an abnormal shortness of the limbs. Owing to the shortness of the legs of a child thus afflicted (see Fig. 283) the center of the body is not at the navel, but at the lower end of the breast-bone. The shortness of the arms of such children is so pronounced that the hands, instead of reaching to the middle of the thighs, reach only to the hips. The head is disproportionately large, the root of the nose is depressed, and, in younger children, the skin of the limbs form several folds. In most cases the mental faculties of these deformed individuals seem to be normal.

MIGRAINE—A form of headache which occurs in paroxysms, and which is generally restricted to one side of the head. It is usually present in those who have an inherited predisposition, but it may also be acquired. The exact nature of this affection is not known, although it is extremely prevalent. It is certain that an attack of migraine may be called forth by occasional causes, such as excitement, dietary errors, violent irritation of the organs of sense (loud noises, intense light, etc.), and sexual excesses. The headache is often accompanied with the appearance of specks before the eyes, and with nausea and vomiting.

The treatment of migraine must be based largely upon a regulation of the diet, and upon proper muscular exercise. A diet consisting of oatmeal, eggs, fruit, and a little meat, is advisable. Alcoholic drinks should be avoided. Moderate exercises, such as work in a garden, gymnastic movements, etc., are highly beneficial; but under no conditions should they be carried to excess. The patient should work without haste. Mental over-exertion is likewise to be avoided. The maxim "do not worry" is pertinent to no other disease more than to migraine. Staying in overheated and smoke-filled rooms, and attending prolonged musical or theatrical performances, are also harmful. Regularity of the bowel functions is of immense importance.

Hypnotism, electricity, water-treatment (cold spongings, cool sitz-baths, etc.), and cures at mountain resorts may be tried with benefit. In some cases special treatment may be required for affections of the eyes, of the nose, or of the sexual organs. The numberless headache-remedies advertised as curing migraine, are without exception dangerous. During an attack of migraine some relief may be obtained by applying hot or cold compresses to the affected part of the head, or by firmly bandaging the head. Resting in a dark room, rubbing the forehead with eau de Cologne or with a menthol pencil, and the drinking of strong coffee or mineral waters may also be beneficial to the patient.

At the onset of an attack it may often be possible to cure or alleviate the affection by manual manipulations. The stomach being usually affected, the procedure is begun with manipulation of the pit of the stomach, which is done by alternately pressing and stretching the region immediately below the ribs. After having repeated this procedure for about two min-

utes, it is followed by manipulation of the hyoid bone as described in the article on VOMITING (which see). This is continued for one and a half minutes with repeated up and down movements of the hyoid bone, and is then followed by manipulation of the head according to the directions given under HEADACHE, turning the face toward the healthy side. Finally, the skin covering the aching parts is stretched and rolled with deft fingers. In some cases it may be necessary to repeat the entire treatment. The manipulations completed, a bandage moistened with warm water is placed upon the patient's head.

With patience and endurance on the part of the sufferer, as well as on that of the physician, it is possible to achieve the best results, whereas changing from one physician to another, and from one quack to the next charlatan, will never improve the malady. One consolation may be given to the patients, in case the disease is very obstinate; namely, that with advancing age it usually loses in intensity, or disappears entirely. It may be mentioned, finally, that when choosing an occupation, patients suffering from severe migraine should prefer callings which permit of staying in the open air as much as possible.

MINERAL WATERS.—Term applied to waters which are naturally or artificially charged with carbonic-acid gas, and some of which contain also alkaline, saline, or acid substances in solution. Springs containing waters so charged are found in various parts of the world. Among *European* springs some of the more noteworthy are Rhens, Niederselters, and Vichy; among *American*, Saratoga (N. Y.), Hot Springs (Ark.), and Las Vegas (New M.). Artificial mineral waters (vichy, selters, etc.) are largely manufactured. They contain only carbonic-acid gas, with which they are rendered sparkling, and furnish refreshing table beverages.

MISCARRIAGE.—See ABORTION.

MORTALITY.—It has been said that “next to birth, the most important phenomenon in life is death”; and the truth of this assertion is tacitly recognized in the care with which records of death as well as those of birth are kept in civilized countries. Yet so complicated are the causes and conditions affecting the mortality of any given community or country, that any attempt to generalize from unclassified statistics in this field is fraught with danger. With all its drawbacks, however, in point of accuracy, the death-rate remains the basis for important judgments and decisions. The healthfulness of different communities and regions, and of different trades and occupations; the prosperity and comfort of the people, the value of efforts at sanitary legislation and the dangers of different modes of living—to all these the death-rate serves as an index. The important relation which it bears to the interests and daily life of a people, was clearly and simply set forth about a score of years ago by Dr. Farr in his “Vital Statistics”: “How the people live is one of the most important questions that can be considered;

and how—of what causes and at what ages—they die, is scarcely of less account; for it is the complement of the primary question teaching men how to live a longer, healthier and happier life. There is a relation betwixt death and sickness . . . There is a relation betwixt death, health and energy of body and mind. There is a relation betwixt death, birth and marriage. There is a relation betwixt death and national primacy: numbers turn the tide in the struggle of population, and the most mortal die out. There is a relation betwixt the forms of death and moral excellence or infamy; men destroy themselves or their fellows under the most varied mental conditions; they may die by indulgence in excesses, by idleness, or by improvidence.”

Age, sex, social condition, conjugal condition, climate, time of year, race and occupation, as well as the sinister influences of crime, vice, and poverty—all tend to modify the death-rate; and in order to arrive at any valid conclusion, the mortality statistics must be considered in connection with all these factors. An abnormally large death-rate is a challenge: first to an explanation, and then to a reformation; for although death itself is a normal process of nature, its occurrence is so largely influenced by human conduct and the advances of civilization, that a large measure of responsibility rests upon those who have the power to direct the factors which have been mentioned as in a measure controlling it. Similarly, a fluctuating death-rate, sensitive to every change of social condition whether for better or worse, indicates in the community a certain instability, a lack of power of resistance, which is analagous to a similar lack in the human body.

In calculating the death-rate, it is the custom to give the number of deaths per annum for each 1,000 of the population considered, a method accurate enough for large populations. By this method the death-rate in the United States for the year ending May 31, 1903, was 16.2. In Europe the heaviest death-rates are found in the eastern part; slightly lower in the central part; and lowest of all in the northern part, where Norway shows 14.8 as against Italy's 22.2, and Hungary's 26.1—all by the census of 1903. The difference, however, is probably not due to mere geographical position, but rather to general social influences and economic conditions. Climate undoubtedly does have an important influence on mortality, especially in those cases where foreigners in large numbers migrate to tropical countries. For instance, in 1891 the death-rate for the British army at home was 4.7; abroad, 13.5. As regards race and religion also, it is probable that any apparent influence which they exert on the figures in question, is really due to concomitant social and economic factors. Thus, the high death-rates in the Slavonic provinces of Prussia and Austria can not be attributed to any inherent weakness in the Slavonic race, but rather to the poorer circumstances under which they live as compared with their Germanic neighbors. Again, the census returns of the United States show a higher mortality among those of foreign parentage; but that is probably to be explained by the larger

proportion of children among that class. The rate for Jews is everywhere low, and this has been attributed in part to their low birth-rate, an association of statistics also paralleled in Ireland. This factor is somewhat discounted, however, by the investigations of official German statisticians who, after comparing birth- and death-rates for a period of 45 years, stated that "it is impossible to discover any connection between the births and deaths in the sense that a high birth-rate corresponds to a high death-rate in the same or subsequent year." Density of population does not in itself seem to influence the death-rate; but where it implies crowded and unsanitary living it increases it, and thus brings up the rate for cities in spite of the advantages which they offer in the way of better medical assistance, hospitals, free dispensaries, and well-managed water supply and sewerage. The factors which cause variation in the death-rate from year to year are war, epidemics, and hard times. The bearing of the first two is obvious. The last-named, however, is more difficult to estimate, as its effects are not immediate, being commonly distributed over a subsequent period of some length, during which those persons whose power of resistance had been weakened by privation succumb to diseases which normally they would have overcome.

The effect of the seasons upon the death-rate is readily seen in a comparison of the mortality tables for countries at different latitudes. In extreme northern countries the heaviest death-rate is found in the winter and the lightest in the summer. In southern countries, on the other hand, as for instance Italy, the greatest mortality is found in the summer months, with a second rise in the winter, the lowest rate occurring in the more equable months of spring and fall. Those countries which are located midway between these extremes show a maximum death-rate in the late winter and another tendency to rise in the summer. In the United States the late winter and early spring take the heaviest toll of human life. Taking 100 as the average, the maximum is reached in March, with 103.6. The difference between this and the summer months would be even more marked than it is, were it not for the tremendous increase in infant mortality during the heated term, which, by a rate of 104 for babies under one year, brings up the general August rate to 82.9. Those years in which the winter is warmer than usual and the summer cooler, are the ones which bring down the death-rate. Considerable variation is often evident from year to year, occasioned by the causes already mentioned; but if longer periods are compared, the tendency to uniformity which is so evident in statistics becomes more conspicuous.

It is a noticeable fact that different ages are affected differently by the extremes of temperature. For instance, very young infants are, as a class, most carefully protected against cold, and consequently do not contribute a proportional quota to those dying in the winter. As soon, however, as they arrive at an age when this protection is no longer given, their weaker organisms render them more susceptible to the rigors of winter than are adults,

and they die in large numbers in the cold weather. As they grow older resistance increases, and between the ages of 20 and 40 years the changes of temperature have little effect on the death-rate. Old people, again, become sensitive to cold; and the summer is the most favorable time for them, even when the heat is considerable. In southern countries the children between the ages of one and five years suffer from the heat to the same extent as do their northern cousins from the cold, and then gradually acquire resistance to it.

In considering the comparative death-rate of the two sexes, we find it higher for men in practically every case, although the census of 1900 reported a slight excess in the death-rate of females in the states of Vermont and New Hampshire. The discrepancy between the two rates varies under different conditions in different countries. Thus in Italy, Holland, France, Denmark, and Ireland, where the women to a considerable extent share the labor of the men, and are more nearly exposed to the same dangers and hardships, the female death-rate is between 93 and 96 per cent. of that of the male; whereas in Great Britain, where the women are less exposed, the female death-rate is but 88 per cent. of the male death-rate.

The most constant and pronounced variations in the death-rate, however, are those due to difference in age. Notwithstanding all the efforts which have been made in all civilized countries during the last decade to reduce the infant mortality, the death-rate continues to claim its highest figures among infants under one year of age. Wherever a strikingly high general death-rate is found, it will, upon examination, be noted that babies of this age contribute vastly more than their proportional quota to the number of deaths. Countries and localities differ widely in the extent of this infant mortality, and this difference forms a pretty accurate index to their relative merits as regards sanitation and healthful conditions of living. The highest rate is found in Bavaria, namely 306; and from this appalling figure, almost equaled by European Russia and West Austria, we find the rest of Europe grading down: Italy, 214; Prussia, 212; Holland, 203; France, 166; Great Britain, 145; Denmark, 138; Sweden, 130; Norway, 104; and Ireland, 97. The low rate in Ireland has been attributed to the rarity of artificially fed babies in that country. The United States, by the census of 1900, has about the same infant death-rate as France; but owing to the much less complete returns of the infant population in this country, there is no doubt that the figures given are higher than the actual facts warrant, could they be secured in complete form. Even the figures that we have, however, are not without encouragement when compared with those of the former census, since they show a decrease of 40.4 per thousand in the deaths of infants under one year of age. Much has been accomplished in the past ten years, and with the growing conviction both here and in England that the infantile death-rate is a matter of grave public and private concern,

much more will undoubtedly be achieved in the next ten years to come. The causes of the high rate are not difficult to ascertain, and many of them are remediable. Undoubtedly improper feeding is the most important; and to this may be added prematurity of birth, congenital defects, hereditary tendencies, infanticide, accident, and insurance of infants. As might be expected the infantile mortality is greatest in cities and towns, owing to the greater prevalence there of crowded and unsanitary conditions, the spread of contagious diseases, the drunkenness and vice of parents, and the employment of mothers away from the homes. Statistics show that the infant death-rate is highest among the poor classes, and lowest among the professional and commercial class. An excessive mortality among illegitimate infants is everywhere observed. In some parts of Bavaria, in the years between 1867 and 1869, as many as 70 or 75 per cent. of illegitimate children died during their first year, a death-rate of 700 or 750 per thousand.

A strikingly rapid decrease in the rate is noted up to the age of ten years, the last United States census showing a drop from 165.4 in the first year to 46.6 in the second, and a more gradual decrease to 3.3 for the period between ten and fourteen years. After that a steady rise begins, gradually increasing also in rapidity to 75.2 between seventy and seventy-four years, 110.5 between seventy-five and seventy-nine years, and 165.8 (just about equaling the infantile rate) between eighty and eighty-four years. For the next three periods of five years each we find the rates of 241.3, 339.2, and 418.9 respectively. Another method of depicting the relation of age to mortality is by estimating the "expectation of life" at various ages; that is, the average of the length of time a man at that age has yet to live. Corresponding with the death-rate, the expectation of life increases up to five years, at which time, as computed by Dr. Ogle's *English Life Tables*, it is 50.87 years for a man and 53.08 for a woman. Thence it decreases, being at the age of fifty years 18.93 for man and 20.68 for woman, at seventy-five years 6.34 for man and 6.87 for woman, and at one hundred years 1.61 for man and 1.62 for woman.

There is no doubt that marriage has an influence on mortality, but in order to ascertain that influence, it is necessary to compare the death-rate of those married with the death-rate of those single *at the same age*. By so doing we find that the death-rate at all ages is less among married men than among single men; and for women the same holds true, with the exception of the period devoted to child-bearing, when it is slightly greater.

Accidental deaths, although furnishing but a small proportion of the total number, afford some interesting variations, due chiefly to the industrial character of the region considered. Mining and shipping industries furnish a large proportion of fatal accidents, and mountainous localities like Switzerland make up with fatal falls their lack of facilities for drowning. Sex and age also control the kind of accident. In England the accidents common

to children under five are, in order of their frequency: suffocation, burns, scalds, and explosions. As the age increases, accidents by drowning come to the front and remain pretty prominent all through life, although in middle life accidents in traveling and in working about mines and machinery take a foremost place. As accidents from other causes remain fairly constant throughout the year, the large number of drowning accidents in the summer months makes the total number of accidental deaths reach its maximum at that time of year. Every summer holiday contributes its contingent, and a glance at any Monday morning paper during the heated term will convince the reader that statistics must be materially affected by the fatalities attending boating and bathing.

Two causes which really affect the mortality-rate but slightly, nevertheless claim a special interest by reason of the ethical element involved. These are suicide and homicide. The rate for the first, although varying largely in different localities, remains surprisingly constant from year to year. The largest numbers of suicides occur in Paris and in the kingdom of Saxony, the latter place being a sort of "suicide center," in radiation from which the rate grows lower. A very interesting study might be made of the relations of age, sex, race, religion, conjugal condition, and industrial position to the occurrence of suicide, but only the most general statements can be given space in an article of this nature. It is believed that people of Germanic race have a greater tendency to suicide than others, although this may be modified by other influences. The Jews invariably show a pronounced aversion to suicide. The figures available give Ireland the lowest suicide-rate, while the United States compares favorably with most other countries. Climate shows no constant effect; but marked changes of temperature, such as occur in the opening weeks of the heated term, tend to increase the number of suicides. Bad times, wars, famines, etc., as might be expected, have the same effect. More men than women commit suicide, and the number increases with age. The proportion is also greater among the unmarried than among the married. In the United States almost one-half of the suicides are by poison, with hanging as second choice.

Homicide has a still smaller effect upon statistics, and involves even greater difficulty in anything like comparative estimates. Consequently, any information on that point must be sought in special studies of criminology.

To take up the question of death by disease, and attempt to classify the statistics, constitutes a colossal task. Only approximately correct results can be hoped for, owing to variations in diagnosis, methods of classification, and care in the collection of facts. Comparison of different countries is necessarily unfair, owing to the impossibility of uniform methods in arriving at figures, as well as to the wide variation in natural conditions. Yet, certain broad general statements may be gathered from the mass of statistics. In the records alike of European countries and of the United States, tuber-

culosis is far in the lead as a cause of death, its closest second in this country being pneumonia, with a record of about nine-tenths as many deaths as are claimed by the Great White Plague. In Italy its greatest rival is typhoid fever, and in Prussia diphtheria; but each of these kills only a little more than half as many as does tuberculosis. In the United States the most fatal diseases after tuberculosis and pneumonia are, in order of mortality: Diseases of the heart, typhoid fever, Bright's disease, cancer, apoplexy, cholera infantum, paralysis, bronchitis, enteritis, meningitis, debility, influenza, diphtheria, convulsions, malarial fever, premature birth, measles, croup, dysentery, inanition, dropsy, and brain-diseases of various kinds. Old age can scarcely be termed a disease, but the number of deaths due to senility would place it after cancer and before apoplexy. "Heart-disease," which may include a number of specific maladies in its general term, causes not much more than half as many deaths as pneumonia alone. It is pneumonia which furnishes the maximum death-rate in March. Diseases of the digestive system, on the other hand, are especially fatal during the heated term; and typhoid fever is at its worst in October. All are familiar with the fact that age largely governs the occurrence of certain diseases. The so-called "childhood diseases" (chicken-pox, whooping-cough, measles, mumps, and scarlet fever) seldom attack adults; whereas, on the other hand, certain diseases are practically unknown in children—as, for instance, cancer. Sex, also, has a bearing on the comparative mortality of diseases, that among males being greater for consumption, smallpox, measles, scarlet fever, diarrhea, and diseases of the nervous system and of the respiratory organs; and that of females being greater in diphtheria, whooping-cough and cancer. In 1904 the death-rate from consumption was 178.1; but about ten years earlier it had been 245.4, a fact full of encouragement, and imperative in its insistence upon a continuation of the intelligent struggle against this preventable disease. On the other hand, the death-rates from cancer and tumor show a decided rise in the years between 1890 and 1904; and investigators are engaged in a determined attempt to discover means of controlling it. For further particulars regarding the death-rate in various diseases, see table on page 581.

The comparative mortality of different occupations is a subject of much interest, but one very difficult to study exactly. Apparent differences may be due to other causes than the occupations; and if complete statistics could be secured, they might be found not to exist at all. The most available figures on this subject are those furnished by Dr. Ogle from his studies of English records. He found the lowest death-rate among clergymen and the highest among hotel servants. Of other professions, the rate for lawyers was higher than that for clergymen, and that for physicians higher yet. The general truths to be gathered from his study may be summed up as follows:

Causes of high mortality in various occupations are:

(1) Working in cramped or constrained attitudes, as silk-weavers, lace-makers, etc.

(2) Exposure to the action of poisonous or irritating substances, such as phosphorus, mercury, lead, infected wool or hair. We have here a list of diseases peculiar to certain trades: Mercury-poisoning in dippers of lucifer matches, gilders, hatters, furriers, and others who make use of mercury; the arsenical poisoning of paper-hangers; lead-poisoning among painters, plumbers, glaziers, gas-fitters, printers, and file-makers.

(3) Excessive work, mental or physical, especially such as involves sudden strains.

(4) Working in confined and foul air.

(5) The effect of alcoholic drinks as seen among innkeepers and wine and spirit dealers.

(6) Liability to accident, as among miners, quarrymen, and fishermen.

(7) Inhalation of dust, increasing the mortality from diseases of the lungs.

The most encouraging fact connected with the death-rate is that, for whatever cause, it is steadily decreasing.

The following tables are taken from the latest mortality statistics issued by the United States census bureau. The registration district of the United States comprises eleven states, and 334 cities with a minimum population of 8,000. While the returns cover only about two-fifths of the entire population of the United States, the registration area is quite extensive; and the figures afford a good means of comparing the healthfulness of various regions. The first table shows the death-rate of the United States as compared with those of several foreign countries. It will be noted that the former compares very favorably with any of the latter, Sweden and Norway being the only two countries showing a lower average death-rate than that of the United States.

NUMBER OF DEATHS PER 1,000 OF POPULATION: 1900 TO 1903.

Country.	Annual Average.	1900	1901	1902	1903
United States.....	16.6	17.6	16.6	16.0	16.2
England and Wales.....	16.7	18.2	16.9	16.2	15.4
Scotland.....	17.5	18.5	17.9	17.2	16.6
Ireland.....	18.1	19.6	17.8	17.5	17.5
Germany.....	20.7	22.1	20.7	19.4	...
Prussia.....	20.3	21.8	20.5	19.2	19.8
Norway.....	14.9	15.9	14.9	13.9	14.8
Sweden.....	15.8	16.8	16.1	15.4	15.1
Hungary.....	26.3	26.9	25.4	27.0	26.1
Netherlands.....	16.7	17.8	17.2	16.3	15.6
Belgium.....	17.6	19.3	17.2	17.3	17.0
Switzerland.....	18.0	19.3	18.0	17.2	17.6
Spain.....	26.9	28.9	27.7	26.1	25.0
Italy.....	22.5	23.8	22.0	22.1	22.2

The next table gives the death-rates in ten states and in the District of Columbia for the years 1900 to 1904, and also the annual average for each state. It will be seen that Indiana and Michigan have the lowest averages; and the District of Columbia the highest.

NUMBER OF DEATHS PER 1,000 OF POPULATION: 1900 TO 1904.

State.	Annual Average.	1900	1901	1902	1903	1904
Connecticut	16.3	18.0	16.1	15.3	16.2	15.9
District of Columbia	20.9	22.3	21.4	20.1	20.3	20.8
Indiana	13.3	14.2	13.8	12.8	12.2	13.5
Maine	16.2	17.1	16.1	15.4	15.9	16.5
Massachusetts	16.7	18.3	16.8	16.3	16.4	16.0
Michigan	13.4	14.0	13.4	12.7	13.2	13.6
New Hampshire	16.7	18.5	16.8	15.9	16.5	16.0
New Jersey	16.6	17.8	16.5	15.9	15.9	17.2
New York	17.5	18.2	17.8	16.6	16.7	18.2
Rhode Island	18.6	20.5	18.2	17.9	19.0	17.5
Vermont	16.1	16.6	16.6	15.0	16.2	16.0
Total	16.2	17.2	16.4	15.5	15.6	16.5

The number of victims craved by various diseases is shown in the following table, which covers a period of five years, from 1900 to 1904.

NUMBER OF DEATHS PER 100,000 OF POPULATION: 1900 TO 1904.

Disease.	Annual Average.	1900	1901	1902	1903	1904
Apoplexy	69.2	67.5	68.4	68.7	68.8	72.2
Appendicitis	10.6	9.7	10.0	10.1	11.1	12.0
Bronchitis	39.5	45.7	39.9	39.5	36.5	36.1
Cancer	66.6	63.1	64.6	65.4	68.9	70.9
Cirrhosis of liver	14.1	12.9	13.7	14.0	14.6	15.2
Diabetes	11.0	9.7	10.3	10.4	11.4	12.9
Diarrhea and enteritis	113.1	133.2	113.9	105.6	101.8	111.8
Diphtheria and croup	33.7	43.3	34.1	31.0	32.0	28.6
Gastritis	12.1	14.0	12.0	11.6	11.7	11.2
Influenza	25.8	22.9	32.3	10.1	18.7	20.4
Heart-disease	120.9	111.2	113.9	118.0	125.5	134.8
Measles	10.1	12.6	7.3	9.5	9.9	11.1
Meningitis	33.1	40.9	33.4	31.3	28.4	32.0
Nephritis & Bright's disease	94.6	89.0	89.6	91.5	98.1	104.2
Old age	44.1	50.4	47.2	44.7	39.4	39.2
Paralysis	21.9	25.9	23.1	21.0	20.4	19.5
Peritonitis	12.1	15.1	13.1	12.0	10.3	10.1
Pneumonia	165.6	180.5	162.0	156.7	156.4	173.3
Puerperal septemia	12.3	11.5	12.1	11.4	12.3	13.9
Tuberculosis of lungs	172.6	180.4	175.1	163.6	166.2	178.1
Whooping-cough	11.3	12.1	9.8	12.1	15.9	6.6

This list shows a gradual increase for apoplexy, appendicitis, cancer, cirrhosis of the liver, diabetes, heart-disease, and nephritis; while bronchitis, paralysis, and peritonitis have decreased during the five years covered by the figures given. The other diseases show fluctuating death-rates. The

gradual decrease in the number of deaths from old age, is explained on the ground of increasing precision in registration, so that a large number of deaths which formerly would have been ascribed to old age are now registered under other causes.

MOSQUITO BITES.—See INSECT STINGS AND BITES.

MOUNTAIN-CLIMBING.—This is essentially a sport which should be indulged in only by healthy persons, as it requires endurance, resourcefulness, and strength. Individuals with weak hearts should not attempt the ascent of a mountain, since this organ is called upon to do an increased amount of work in high altitudes. Before undertaking an ascent it is well to prepare oneself by systematic training, comprising gymnastic movements as well as breathing-exercises. The danger of accidents from falls, snow-slides, etc., may be reduced to a minimum by taking guides along, and by providing oneself with the proper outfit (ice-axe, alpenstock, rope, etc.). The highest ascents recorded in the Swiss Alps average about 15,000 feet; in the Himalayas 24,000; in the Rocky Mountains 14,000; and in the Canadian Rockies 12,000 feet.

Inhabitants of low-lying districts, when ascending to a height of 9,000 feet or more, are prone to become afflicted with a series of disease-symptoms to which the name of "mountain-climber's disease" has been applied. These symptoms consist of cardiac palpitation, difficulty in breathing, great fatigue, and vertigo. If the ascent be continued there may follow hemorrhages from the nose, mouth, and eyes, unconsciousness, and even death. The condition is ascribed to the very much diluted air of high altitudes, and the consequent diminution in its contents of oxygen. In order to supply the body with the necessary quantity of this gas, the heart and lungs are subjected to great overexertion. Respiration becomes more frequent; and the increased activity of the heart causes this organ to become readily fatigued. A number of other factors are contributory to the disease, the more important being a rush of blood to the skin and mucous membranes caused by the diminished atmospheric pressure, the cold and dry air, the strong light, and the exertion necessitated by climbing. Upon the first evidence of trouble further climbing should cease and the body be allowed to rest. The cardiac weakness may be favorably influenced by drinking a little wine or some strong coffee. In order to prevent the disease it is well to apply the same rule to mountain-climbing as to other sports; namely, to practise moderation, and to accustom the system gradually to the changed conditions. The ascent of a mountain should, therefore, be slow, and interrupted by frequent periods of rest. If distressing symptoms appear, it is better to turn back than to continue the ascent at the risk of injuring health.

A train of symptoms similar to those described may result from a balloon trip, although as a rule they do not come on until a somewhat higher alti-

tude is reached—about 12,000 feet or more. It has lately been noted that railway journeys in high altitudes may prove dangerous to elderly persons unaccustomed to these elevations, and also to patients suffering from calcification of blood-vessels. It is advisable for such individuals to accustom themselves to atmospheric changes in some moderately elevated locality, and to seek medical advice before undertaking a journey which might expose them to the danger of contracting disease.

MOUTH-DISEASES OF CHILDREN.—Inflammation of the mucous membrane of the mouth is a not infrequent affection in young children. It usually results from some gastro-intestinal disturbance, and is characterized by fever, increased thirst and salivation, and pains during sucking or chewing. In the course of the affection round, white or yellowish, slightly elevated spots (*aphthæ*), which are surrounded by red areolæ, appear at the tip and edges of the tongue, and on the mucous membrane covering cheeks and lips. The size of these aphthæ varies between that of a pin-head and that of a bean. The affection is not dangerous, and with proper medical treatment it is usually cured in a few days. Only very small children are seriously endangered by the disorder if it interferes with nutrition. Treatment is local, and consists in washing or painting the mouth with medicinal preparations. For a description of *thrush*, see NURSING, CARE OF.

MOUTH, INFLAMMATION OF.—See STOMATITIS.

MUCILAGES.—These are watery solutions of gummy substances. They are thick, viscid liquids, and are principally used as vehicles for other drugs. In the United States Pharmacopœia there are four official mucilages: acacia, sassafras, tragacanth, and amyllum.

MUCOUS COLIC.—An intestinal affection which is characterized by the discharge of large shreds of mucus. It occurs at all ages, but especially in youth, more frequently in women than in men. The causes are not well known. Excessive secretion of mucus is the result of an irritative condition of the mucous membrane of the intestine, often caused by persistent constipation. The use of enemas and of bowel irrigations is said to produce it occasionally. A nervous irritation of the intestine, however, acts as the chief cause; and hence the affection is found principally in nervous patients. The secreted mucus may accumulate for days, assuming the form of the intestinal canal, and is then discharged in large tubular shreds. The admixture of mucus with the stools, occurring in affections of the rectum, must not be confused with mucous colic. In the former affection the mucus covers the excrements in small shreds, whereas in mucous colic it is discharged as cylindric casts of the intestinal tube, often without any admixture of feces. These intestinal casts may be up to ten inches long.

The shreds of mucus may often be discharged for weeks and months without being noticed, an accidental inspection of the stools by the patient or by a physician leading to discovery of the condition. In many cases the

affection causes no disturbances; in others, indistinct symptoms, such as slight pain in the abdomen, a feeling of fulness, etc., merely suggest the presence of a disorder of the bowel. Sometimes, however, the mucous masses are discharged with violent colicky contractions of the intestine, which cease soon after the bowels are empty. Mucous colic may persist for years without materially impairing either nutrition or the general health. As a rule the patient does not consult a physician until the violent abdominal spasms compel him to do so. In addition to constipation, mucous colic may be associated with other affections of the bowels, such as descent, relaxation, and flatulence of the intestine.

Treatment is based principally upon removal of the persistent CONSTIPATION (which see). Regulation of the bowel function is the best means of preventing the accumulation of large masses of mucus in the intestinal tract. Injections of warmed sweet-oil have been found very efficacious in mucous colic. Particular caution should be given against the employment of irritating and astringent remedies for irrigation of the bowel, as they almost invariably increase the secretion of mucus. The diet should consist principally of vegetables. Since the affection appears to be a nervous disorder of the intestine, the treatment of the fundamental weakness of the nervous system is generally prerequisite to a permanent cure. Hardening the bowel by water-treatment can be greatly recommended. Particulars must be given by a physician.

MUD-BATHS.—Immersion in mud, or covering the body with mud, constitutes a therapeutic measure which is of value in gout, rheumatism, diseases of the spinal cord, and in certain female disorders. A mud-bath should always be taken in a wooden tub. For home use Mattoni's mud-salt or mud-extract may be recommended. If mud be at one's disposal it should be stirred with hot water into a thick mass. Mud-baths should have a temperature of 104° F., and should last up to thirty minutes. While taking the bath, it is advisable to apply a cold compress to the head. A mud-bath should be followed by a cleansing bath of a temperature of 95° F., and afterward by rest in bed. These baths should not be taken by old or debilitated persons, children, or patients suffering from heart-diseases, affections of the lungs, or calcification of veins and arteries. See also FANGO.

MUMPS.—Inflammation of the parotid glands. It is an infectious disease which often occurs epidemically, especially in spring and autumn, principally affecting children and young persons. With slight fever and insignificant disturbances of the general health, a doughy swelling develops in front of and under the ear, extending forward to the lower eyelid, and downward to the throat. The lobe of the ear is raised and stands out. Pain is experienced upon opening the mouth. Usually both parotid glands are affected, either simultaneously or successively (see Plates XVIII. 5, and X. 1). The face is peculiarly deformed by the affection, creating an almost

comical impression. As a rule the inflammation recedes in the course of a week. Suppuration or hardening seldom occurs. In exceptional cases (during a severe epidemic) the inflammation may extend also to the testicles, to the female breasts, to the ear (causing deafness), and to other parts.

Mumps usually runs a favorable course of short duration. Isolation of the patients is rarely resorted to; but it is advisable to protect all children as much as possible from infection. The inflammation furnishes few points as to treatment. The physician will alleviate the existing disturbances, and

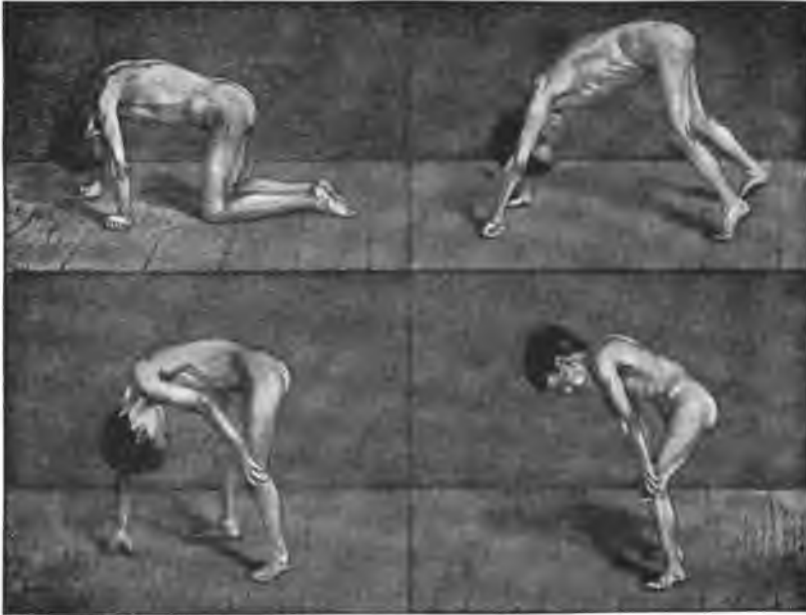


FIG. 284. Progressive muscular atrophy in a child; showing difficulty in raising the body

watch for the appearance of possible secondary affections. If suppuration sets in, there is danger that the pus may perforate into the auditory canal and middle ear, causing permanent disturbances of hearing. It is best, therefore, to have a physician drain the pus as early as possible. Mumps occurs not only as an independent disease, but also as a complication of other affections (typhoid fever, smallpox, blood-poisoning, etc.). In these cases it is a more serious affection.

MUSCÆ VOLITANTES.—Small specks or gnat-like objects apparently moving before the eyes. They may appear in various forms, and may be either bright or dark, but they do not interfere with vision. The *muscae volitantes* appear especially when looking suddenly into bright light, or upon rapid raising and lowering of the eyes. The phenomenon is due to the presence in the vitreous humor of minute motes which become visible by throwing their shadows upon the retina. The condition is of frequent occur-

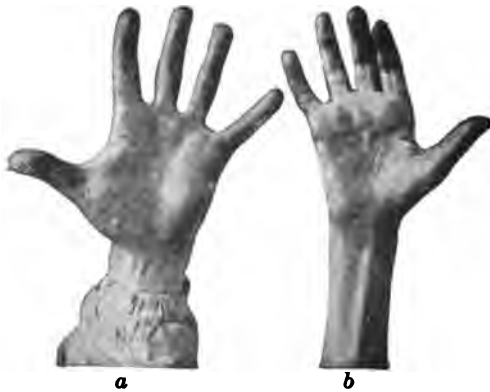


FIG. 285. *a*, normal hand; *b*, hand deformed by muscular atrophy.

rence in near-sighted persons, in whom the shadows may be so distinct as to cause serious apprehension. This fear, however, is unfounded if vision is otherwise normal, and if the vitreous humor contains no opacities, which may be readily ascertained by means of the ophthalmoscope.

MUSCULAR ATROPHY.—

Diminution in the volume and strength of muscular tissue, and fatty degeneration of the same. The muscles are nourished by substances carried to them by the blood; and the centers of nutrition in the spinal cord regulate the distribution of these nutritive substances so that a muscle will be supplied with such as it is able to utilize in place of those expended. Motion is necessary for the correct incorporation of the muscle-forming material. Muscular atrophy may be brought about by any one of the following three causes: (1) Insufficiency, or faulty composition, of the blood (as in chlorosis, anemia, and many disorders of metabolism); (2) affections of the centers of nutrition in the spinal cord, or of the nerves extending from them to the muscles, thus depriving the latter of the necessary nerve stimulus; (3) lack of exercise of the muscles, either because they are affected by diseases (rheumatism, inflammation, etc.) which prevent their being properly used, or because they are restrained by splints or bandages (as in the presence of a fracture of a bone).

Progressive muscular atrophy, or creeping palsy, constitutes a special form of degeneration of the muscular tissue. It occurs hereditarily in some families, often affecting the children, and usually beginning in the legs. Children thus afflicted forget how to walk. They can raise themselves only by constantly supporting their body with their hands, first upon the floor, and then upon the leg, thus virtually climbing up their own legs (see Fig. 284). There are different forms of this affection. It may first affect the muscles of the thumbs and little fingers (see Fig. 285), or it may begin in the



FIG. 286. Progressive muscular atrophy in an adult.

muscles of the shoulders and arms (see Fig. 286). The disease is rarely curable, although improvement, or even arrest, may be brought about in the early stages by massage, electricity, water-treatment, internal medication, etc.

MUSHROOM-POISONING.—The eating of poisonous mushrooms results in characteristic symptoms of poisoning. In the more rapid type the symptoms come on a few hours after eating the mushrooms, when a tearing pain is felt in the abdomen. There is violent nausea and incessant vomiting which may persist for days, bloody, mucous, watery diarrhea, tormenting thirst, coldness of the limbs, difficulty in swallowing, debility, anxiety, vertigo, and spasms. Sometimes disturbances of vision, and delirium resembling intoxication may also occur. In a second type of poisoning the symptoms come on later—in from 18 to 24 hours after eating the poison. Until the arrival of the physician attempts should be made to induce vomiting, and a purge should be given. Milk, mucilages, black coffee, Hoffmann's anodyne, and cold compresses to the head are in order.

Of the mushrooms illustrated in Plate XX., the upper three rows show the edible varieties to the left, and to the right the poisonous ones that are apt to be mistaken for the former. The champignon or *Agaricus campestris* (1) has a white to brownish cap, rose-colored (later brownish-black) lamellæ on the under side, and a full stalk. Death's head or *Agaricus (Amanita) phalloides* (2) has a greenish, yellowish, or whitish cap, white lamellæ, and a hollow stalk. The chanterelle or *Agaricus (Cantharellus) deliciosus* (3) has yellowish-red lamellæ, a verdigris color appearing upon pressure and breaking, and a saffron-yellow or brick-red juice exuding at the points of rupture. In the poisonous chanterelle or *Agaricus (Cantharellus) torminosus* (4) the lamellæ and the juice are both white, the verdigris color of broken parts is absent, and the border of the cap is provided with white hairs (beard). In the golden agaric or *Agaricus (Amanita) Cæsareus* (5), all parts (except the surface of the cap and the white, loose skin surrounding the base of the stalk) are pale yellow. The fly agaric or *Agaricus (Amanita) muscarius* (6) has white lamellæ, stalk, and meat, and a bright orange-colored cap with white spots; its stalk is bulbous at the base, and has a white ring at its upper extremity. The edible boletus or *Boletus subtomentosus* (7) has a velvety, yellowish cap covered with a felt-like skin, yellowish to brownish-green tubes, and a yellowish stalk supplied with red or reddish-brown streaks. Satan's boletus or *Boletus satanas* (8) has a smooth, yellowish cap turning blue when broken, orange-colored or blood-red tubes, and a stalk which is bulbous at the base, dark red or yellowish in its upper part, and covered with a yellowish-white network.

In spite of the most careful observation of the differences between poisonous and edible varieties of mushrooms, cases are often encountered in which poisonous ones have been gathered and eaten by mistake. The

invariable rule, therefore, should be to eat only such mushrooms about the edibility of which there can be absolutely no doubt. The important ones are shown in Plate XX. It should always be borne in mind when gathering mushrooms, that many poisonous varieties closely resemble the edible forms. Thus the *Death's Head* resembles the *Champignon*; the *Poisonous Chanterelle* resembles the *Edible Chanterelle*; and the *Fly Agaric* may readily be mistaken for the *Golden Agaric*. Mushrooms which are sometimes poisonous, though at other times edible (such as the *Helvella*), should always be avoided. Worm-eaten mushrooms, and such as have been invaded by insects, should likewise be rejected. Raw mushrooms should never be eaten. If doubt exist regarding the poisonous or non-poisonous qualities of a mushroom, it is a good precaution to boil it several times, pouring away the water in each instance. The amateur should never eat mushrooms that he himself has gathered.

MUSHROOMS.—These belong to the highest class of fungi, and usually consist of a cap-like expansion (the *pileus*) which is supported upon an erect stalk. Mushrooms may be edible or poisonous. Among the edible varieties the best-known is the *Agaricus campestris*, usually known as agaric, or (in French) champignon. The food value of mushrooms is generally being either overrated or underrated. Some of their most ardent fanciers have even gone so far as to place them on a par with meat, because of their high percentage of proteins. This, however, is exaggerated. Still, it may be said that they possess a nutritive value which would warrant their more extensive use, especially by people who live in localities where they are plentiful.

Mushrooms contain about 90 per cent. of water, and about 3 per cent. of protein which, by drying, may be increased to 17–18 per cent. But only about 65 per cent. of this protein can be utilized by the digestive organs. Dried mushrooms are more difficult of digestion than fresh ones. In preparing mushrooms for the table, care should be taken that they are cleaned scrupulously, whereupon they should be boiled and the water thrown out. Warmed-over mushrooms are not to be recommended; and those that have been preserved, either dry or in vinegar, should not be used for actual meals, but only as condiments to sauces. Owing to the dangers which may arise from mistaking poisonous mushrooms for edible varieties, great care should be taken to gather only such as are absolutely known to be edible. See **MUSHROOM-POISONING**.

MUSK.—A secretion obtained from the preputial follicles of the musk-deer of Tibet, the *Moschus moschiferus*. It has a very penetrating, characteristic odor. Musk is a nerve sedative and mild stimulant. It is given to quiet nervous excitement, particularly in hysteria. In pneumonia and typhoid fever it is sometimes of use, acting both as a stimulant and sedative to the nervous system. It is often of service in stopping obstinate hiccup.

Musk is a very expensive drug, for which reason it is not very commonly used. The dose is five or ten grains.

MUSTARD-BATH.—This is generally used for feet or hands, and is prepared by adding several tablespoonfuls of powdered mustard to a pail of warm water. Immersion should last only until the skin reddens and begins to smart, whereupon the bathed parts should be washed. Children should never be given mustard-baths without medical advice, as they may become badly blistered.

MUSTARD-PLASTER.—See DOMESTIC REMEDIES.

MYRRH.—A gum resin obtained from the *Commiphora Myrrha*, an Arabian tree. Its active principle is *myrrhin*. It is used in connection with iron for menstrual disorders accompanied with anemia; and the tincture of myrrh is sometimes used with other drugs as a gargle or mouth-wash. Ten to thirty drops of the tincture are given.

N

NAIL, INGROWING.—A condition in which the border (or borders) of a nail presses into, and pierces, the underlying skin, so that the cutaneous fold projects over the edge of the nail. Like the sharp edge of a piece of glass, the border of the nail continues to press upon the wound created by

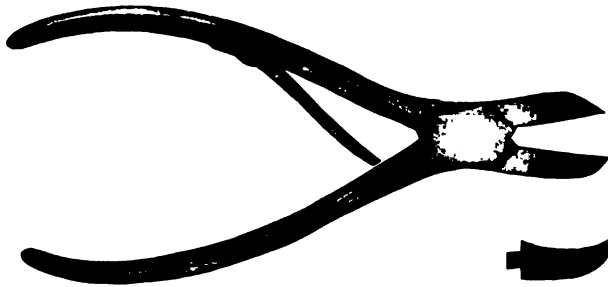


FIG. 287. Heflerich's nail-scissors.

itself, causing intense pain. Ingrowing nails usually occur on the great toes; and the only means of preventing this painful condition is by regular cutting of the corners of the nails. Heflerich's nail-scissors (see Fig. 287) are an excellent instrument for this purpose, because of their peculiar shape which makes it possible to insert the blades under the corners of the nail sufficiently deeply to lift the latter painlessly from its depressed position.

NAILS, BITING OF.—This is a bad habit, which is met with even in grown persons. Not only is it a detestable sight to others, but it is disagreeable also to the person who does it, since it renders the fingers so ugly in appearance that they are kept hidden as much as possible from the gaze of strangers.

It is not easy to overcome the habit. The popular remedy of putting bitter or badly tasting substances upon the tips of the fingers may help for a short time, but the person addicted to the habit is prone to resume it sooner or later. Careful training promises the best results.

NAILS, CARE OF.—A well-groomed nail is smooth, bright pink in color, with a snow-white, crescent-shaped disk at the base, and bordered by a fine narrow membrane (the nail-fold). The right and left borders of the nail should be slightly and uniformly curved. The projecting corners of the outer margin of the nail should be carefully trimmed (see Figs. 288, 289); and the slightly pointed edges should be kept scrupulously clean, as dirt accumulating under the nails often contains infectious micro-organisms. So-called "hangnails" (loose pieces of skin near the roots of the nails) should



FIG. 288. Trimming the finger-nails.



FIG. 289. Properly trimmed finger-nail.

be cut off with scissors close to their base. They should not be torn out, owing to the danger of infection of the small wounds thus made.

A nail-brush is not a good utensil as it is difficult to keep clean, and is often the immediate cause of the formation of hangnails and of small injuries. Marble-dust soap, nail-cleaner, nail-file, and a pair of scissors are the articles required for the proper care of the nails. The nails should never be washed with preparations containing alcohol (eau de Cologne, bay rum, etc.) as these will cause the nail-folds to become chapped and fissured. Wax-powders, such as are often advertised in the market, are quite suitable for polishing the nails. The free edges of the nails should always be cleaned with the utmost caution. Loosening of the nail-bed is painful, and not without danger. A split nail should at once be cut to the end of the fissure, since otherwise it will continue to tear more and more deeply.

NAILS, DISEASES OF.—The nails, like the hair, being developed from the skin, it is obvious that a number of diseases affecting the skin may affect the hair and the nails also. This is particularly true of the nails, owing to their peculiar anatomical structure. The greater portion of a nail is corni-

fied; and, like a foreign body, the nail mechanically aggravates existing affections of those portions of the skin situated underneath it, debarring them from the action of healing remedies. Suppurations of the nail-beds are, therefore, very difficult to treat, and often do not heal until after the nail has either been removed or cast off spontaneously. At the very beginning of a throbbing pain at the root of a nail one should, therefore, consult a physician in order that an effort may be made to overcome the infection.

When a splinter has entered beneath a nail, and can not be removed, the superficial layers of that part of the nail which covers the splinter should be softened by the application of a 50 per cent. potash-lye, and then scraped with a sharp knife until the entire splinter is laid bare, when it can be readily removed. It is best, however, to have a physician attend to this treatment.

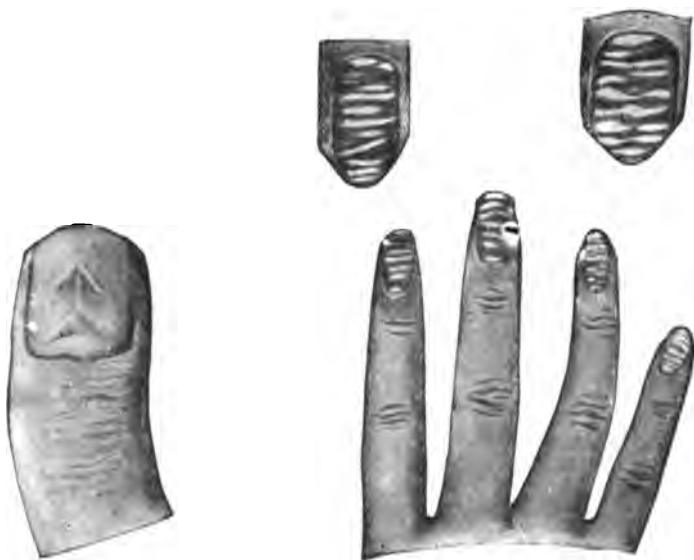


FIG. 290. Deformed finger-nail.

FIG. 291. White-spotted finger-nails.

Infection by fungi often causes a peculiar, rough-streaked transformation and deformity of the nails (see Fig. 290), the treatment of which requires great attention. Such proliferations of fungi may cause the complete loss of a nail, such as is noted also in some general affections (syphilis), with softening and ulcer formation. A badly healing ulcer of a nail, accompanied with a doughy, vitreous thickening of the entire finger, presenting flat ulcers and warty crust formations, and which for months is refractory to treatment, is also invariably a sign of syphilis of the nails, and is often rapidly cured by the internal or external employment of mercury.

White spots frequently develop in the nails (see Fig. 291). These owe their existence to air that entered during the growth of the nail, and is confined there. A white, crescent-shaped mark at the root of a nail is

considered a sign of beauty. An injury to a nail causes the exuded blood to shine through the nail with a bluish color, only the crescent retaining its white appearance.

The growth of nails in places other than at the ends of the digits (on the sides of the fingers, on the back, or on the neck) is an extremely rare abnormality. A so-called "griffin-claw" is of more frequent occurrence, especially on the feet, when the nails have not been properly attended to. The nail develops into an unevenly raised claw, resembling the bill of a parrot.

NAPHTHALENE.—A coal-tar product occurring in flat, colorless crystals. It is an active antiseptic, and is used as a gastric and intestinal disinfectant. Naphthalene is given in doses of about one-quarter of a grain to prevent fermentation, and in some forms of diarrhea. It is said to cause eructations tasting like the fumes of burning rubber.

NARCOTICS.—See SLEEPLESSNESS.

NASOPHARYNGEAL TONSIL, ENLARGEMENT OF.—The nasopharyngeal tonsil is called also the pharyngeal or third tonsil. When it is enlarged



FIG. 292. Facial expression when nasal respiration is prevented.

one speaks of proliferations in the nasopharyngeal space. This tonsil can not be seen when the mouth is open, and it should not be confounded with the palatal tonsils situated to the right and left of the uvula. Enlargement of the pharyngeal tonsil results in loud snoring with the mouth open, snuffling speech, temporary difficulties of hearing, and stitches in the ears. Small children often stop abruptly when drinking; older ones eat insufficiently and slowly, and snort when chewing or drinking. At night they sleep with their mouths open, restlessly tossing from side to side; sometimes they breathe superficially, at other times they

sigh deeply, and they are apt to scream aloud during their dreams. Even older children often void their urine in bed when asleep. School-children often complain of headache and fatigue. Their vivacity, attention, and comprehension, as well as their memory, may become impaired; and their gaiety and fondness of bodily exercise diminish. Even without preceding suppuration or inflammation, hearing may become impaired to such an extent that the teacher's lectures can be only imperfectly understood. The presence of these symptoms in a child should cause the parents to have

it examined by a physician. Physicians who regularly attend to a school will readily single out children thus afflicted. A hereditary predisposition to the affection is often present.

Proliferation of the pharyngeal tonsil has still more remote consequences which are of importance to parents and teachers. The features become changed; the nose becomes too small; the hard palate assumes an abnormally high curvature resembling a pointed arch, so that the front teeth of the upper jaw are advanced in front of the lower ones, as is the case in rodents. Many teeth may turn so that their side-edges point forward; others may be completely crowded out of the row, owing to lack of space. Also the shape of the thorax may change, its lower portion becoming depressed. A person suffering from enlargement of the nasopharyngeal tonsil usually has a typical facial expression, as shown in Figs. 292 and 293. These illustrations also show the inferior development of the chest due to the respiratory difficulties.

NATURAL METHOD OF HEAL-

ING.—Within recent years this country has witnessed an enormous increase in the number of lay “healers,” many of whom claim to heal according to the “natural method.” It is difficult to explain what they mean by a “natural method of healing.” Some believe it to be a method which leaves the course of the disease entirely to nature; others maintain that



FIG. 293. Typical attitude of the body in the presence of respiratory difficulties.

it is a system which makes use only of natural and harmless remedies, and which requires neither operations nor medicines for the treatment of bodily ills. Neither of these contentions, however, is correct. The natural method of healing, with its steam-baths, sweat-packs, etc., most energetically interferes with the course of the disease; and it is, therefore, by no means a *natural*, but in every way an *artificial*, method of treatment. Nor are the “natural” forms of applications harmless; for, like medicines, non-medicinal remedies cause by-effects which eventually are most undesirable. Incorrect or unsuitable employment of water, steam, massage, etc., may not only injure, but even kill, the patient. The so-called “harmless” methods employed in “natural treatment,” handled by ignorant and untrained laymen, have often caused the most serious injuries to health; and, as a matter of fact, the number of patients killed by “natural” healers is very large.

The early claim of these cults, that they never used medicines, has gradually passed away; and now drugs in the form of "innocent" herbs and plants are widely employed by these healers. They even prescribe opium, morphin, digitalis (foxglove), and similar deadly poisons. Nor can the circumstance that they claim to cure without operations be regarded as an advantage by any thinking man or woman. After numerous patients had paid the death penalty for their faith in "medical art without operation," some of the followers of the system were sagacious enough to see that in many cases operation is the only measure that can save the patient's life. "Natural" surgery, osteopathy, etc., are the results of this change of opinion. The adherents of "natural" healing have manifestly thereby admitted that a one-sided method, without medicines or operation, is not sufficient for the treatment of the sick. Hence, they have adopted the view which ever since the oldest times has been held by scientific medical art—namely, that in order to effect a cure every means must be resorted to which nature and art place at the disposal of man.

The "natural" method has, therefore, during its development of about one hundred years, demonstrated its own superficiality and the superiority of the regular school doctor. Unfortunately, this demonstration has cost many lives, and will continue to do so until this natural method is definitely dispensed with. That it still persists is due principally to the self-advertising carried on by its followers in lectures, newspapers, and pamphlets, and by societies founded especially for its propagation. Not only do they promise to heal all patients, but they pretend also to be able to so instruct the healthy that they shall become capable of treating themselves in case of disease. And all these claims are made still more spicy by slander and aspersion of scientifically trained physicians. The "natural" healers thus appeal either to people's vanity, to their lack of criticism, or to their delight in what is "sensational." But by these methods they condemn themselves. Every sensible and rational person ought to understand that incurable patients remain incurable, and that no person suffering from a severe disease is able to treat himself. If this be not done even by physicians, why should the laity be advised to do so? And every person who is able to think logically will know that the slanderous remarks and the unfounded calumnies of these dishonest competitors are merely the waning cries of those that are soon to succumb. Regular medicine can look back upon a development of 2,000 years; and in spite of all attacks it is bound to remain the healing art also of the future.

NAUSEA.—A symptom which generally precedes vomiting. Sometimes it indicates a serious stomach trouble; at other times it is of purely nervous origin. If a disturbed stomach be the cause, vomiting will give relief. In other cases nausea may be overcome by loosening all tight garments (corset, collar, etc.), by washing the face with cold

water, by taking a cold drink or a saline draft, or by sucking small pieces of ice.

The Nægeli massage method described in the article on VOMITING is of service also in the treatment of nausea. The form of nausea from which many ladies suffer, especially when riding in trains, may be effectually warded off by practising the same procedure several times before the commencement of the trip, for one and a half minutes at a time. This should be tried also in cases of seasickness.

NAVEL-DISEASES.—Various disorders may affect the navels of young infants, and may be brought about either by lack of proper care and cleanliness, or by accidental causes, diseases, etc.

Hemorrhage from the navel may be either mild or sinister, according to the cause. The mild form is usually due to defective tying of the umbilical cord; whereas the severe form (which often rapidly leads to death) generally results from some other affection. Even the slightest bleeding from the navel calls for the most scrupulous cleanliness as well as for prompt medical aid. Until the physician arrives the bleeding navel should be covered with antiseptic cotton, either plain or saturated by a 3 per cent. solution of boric acid. The severity of the affection is often manifested by preceding jaundice, hemorrhage from the mouth and anus, or by doughy swellings of various parts of the body.

Inflammation of the navel is caused by uncleanness and by improper treatment of the stump of the navel. It is characterized by heat, redness, and swelling of the navel and its surrounding parts. Above all, care should be taken

not to touch the wound of the navel with unwashed fingers, nor to cover it with soiled bandages, nor to permit the child's bath-tub to be used for washing the soiled linen of the mother. This affection of the navel requires the help of the physician, in order not to expose the infant to the most serious danger of blood-poisoning. The wound should be covered with antiseptic cotton immersed in a 3 per cent. solution of boric acid.



FIG. 294. Sticking-plaster bandage for umbilical rupture.

Navel fungus consists of a reddish-brown proliferation of small fleshy warts (so-called "proud flesh"), varying in size from that of a lentil to that of a cherry-stone, which develops on the wound caused by the falling off of the navel stump. Injury to this fungus is very liable to give rise to hemorrhage and inflammation; and it should, therefore, be removed by the physician.

Umbilical rupture usually appears several weeks or months after the birth of the infant, and is brought about particularly by conspicuous flatulence, persistent crying, or strong pressure during the discharge of urine. This causes the thin scar of the navel to be pressed forward, and the umbilical ring to become widened; and the expansion thus produced is filled up with a portion of the small intestine. After removing the cause (which may be a narrowing of the prepuce necessitating a slight operation) a sticking-plaster bandage properly applied will soon bring about recovery (see Fig. 294). On top of the sticking-plaster should be placed a wad of cotton, fastened with a gauze bandage which can be removed during a bath. Pads and trusses should not be considered. A rupture may be found immediately after birth at the insertion of the umbilical cord. This is a very dangerous condition, and requires the prompt attention of a physician.

NEAR-SIGHTEDNESS.—See SIGHT, DISTURBANCES OF.

NEPHRITIS.—See *Bright's Disease*, s. v. KIDNEYS, DISEASES OF.

NERVOUS PROSTRATION (NEURASTHENIA) AND NERVOUSNESS.—

By nervousness is meant an exhausted, weak, and irritable condition of the nervous system. This irritability is the distinguishing characteristic by which the weakness of the nerves is manifested in neurasthenia. One thinks of nervousness more as a quality of temperament, whereas in neurasthenia the symptoms present a more or less complete, clear, and characteristic picture of the disease which in the last half of the nineteenth century became so widely spread that it was called the "disease of the century."

The causes of nervous troubles lie largely in the mode of living. The populations of civilized lands have increased enormously during the last century. The individual's struggle for existence has become harder and harder, and calls for a continually increasing nerve-strain. At the same time one can not escape disappointed hopes and accidents of fate. Sickness, sudden pecuniary losses, misfortune, sorrow, and overstrain in mental work accompany them. An unhygienic mode of living, and the use of narcotics and stimulants, completely ruin the shattered nervous system. The chief causes of neurasthenia may conveniently be treated in separate paragraphs.

1. Heredity. In many cases a perfectly healthy person may develop nervous prostration through continuous overstrain in mental or physical work, with insufficient recreation. Often, however, heredity plays an important rôle. Weak, sickly, and nervous parents are apt to beget children who have a tendency to weakness. To be sure, by means of suitable edu-

cation and nourishment these can be brought up to become strong, healthy men and women, and need not necessarily become neurasthenic. In many instances, however, this becomes the case, because the tendency that lay dormant in them from their birth was not eradicated.

2. Education. The methods employed in the education of children at home and at school are often conducive to making them neurasthenic. Children who are mentally inferior should by all means be instructed separately, and not together with normal and healthy children. In many cases, however, parents spoil a child through overindulgence, so that it becomes wilful and capricious, and remains so. It does not learn to control itself; its will is never disciplined and strengthened. Unfortunately it seems as though parents had a special affection for their weak offspring, as a result of which they are apt to let them grow up into men and women without character. Such unsuitable bringing up shows its worst effects in girls, who often remain superficial and arrogant all their lives long, or become the victims of neurasthenia and hysteria. Boys are more apt to get these resultant weaknesses rubbed off through the inevitable friction of life.

3. After-Effects of Sickness. It is self-evident that any initial, severe disease may expose a person to an attack of neurasthenia. This is especially the case if the convalescent does not allow himself sufficient time for recovery; as, for instance, if he returns to his business too soon, or if a woman (as is so often the case) gets up too soon after confinement, or nurses her child too long.

4. Occupation. Many occupations and professions apparently tend to make their followers neurasthenic, chiefly such in which great mental strain and responsibility occur, especially when accompanied by unfavorable conditions of life, such as insufficient income, neglect, etc. This is the case with many officials, school-teachers, and countless business men. Brain workers, such as bankers, merchants, and professional men, are especially liable.

5. Excessive Physical Strain. Since every muscular exertion fatigues the nervous system, and causes mental weariness, it is clear that an excessive amount of physical labor may be the cause of nervous exhaustion, which can eventually lead to neurasthenia. Muscular activity and mental activity conflict with each other in their higher degrees. Hercules with his small skull, and the philosopher Kant with his weak muscles illustrate this assertion. It is recognized that among school-children the brightest in their classes are the poorest in the gymnasium, and vice versa.

6. Environment. The influence of one person upon another is very great. An individual is imperceptibly influenced by every other person with whom he is brought into daily contact. A person whose nervous system has a tendency toward neurasthenia is especially liable to become morbidly influenced by other people. In many cases the mere mention of

a disease to a morbidly nervous person is enough to make him ill in reality. For this reason neurasthenia is sometimes said to be contagious.

7. Social Life. The frequent participation in social affairs that last late into the night very often leads to nervous excitation and exhaustion, and if aggravated by the use of stimulants (alcohol and tobacco) the effects are especially disastrous.

8. Insufficient Sleep. This is a very frequent cause of nervous break-down. Mental overwork during the day very often causes sleeplessness at night, giving rise to headache and nervousness. Nurses and sisters of charity become neurasthenic through continued night watching, and poor care of themselves. It is very detrimental to health to interrupt the sleep of young people and children, and for this reason school should never begin too early in the morning.

9. Sexual Life. The sexual follies frequently indulged in by growing youth of both sexes (such as masturbation, etc.) may frequently be the cause of nervous troubles; especially if nervous or anemic tendencies be present, or if the follies be continued for a long time. The perversities practised in marriage are likewise often the cause of neurasthenia in both sexes.

The chief symptoms of neurasthenia are headache, backache and other pains, palpitation, dizziness, anxious feelings, a tendency to bodily fatigue, muscular weakness, insomnia, poor digestion, heartburn, impaired memory (inability to do mental work for any length of time), lack of energy, weakness of will, mental depression, the fear of having some serious disease (of the heart, brain, or of the spinal cord), abnormal sensations in the sexual organs, lack of desire for work, aversion toward society, fixed ideas, brooding, and moods changeable according to the weather.

According to the preponderance of certain groups of these symptoms in the description of any given case, one may distinguish among the following different forms of nervous diseases:

1. Brain Neurasthenia: Brain-pressure, headache, weakness of memory, dizziness, insomnia. The fixed idea of neurasthenia, the anxiety, and the neurasthenic weakness of will belong to a different class. The most prominent symptoms connected with these manifestations are lack of energy, a constant desire to lie down, lack of resolution, negligence of duties, and worry.

2. Neurasthenia of the Spinal Cord: Backache, pains or unnatural sensations in the legs, and painful sensations in the different organs, joints, and skin, such as tickling, itching, muscular cramp, trembling, muscular restlessness, and twitching of the muscles of the legs.

3. Heart Neurasthenia: Palpitation, anxiety, shortness of breath, pains in the chest. To this class also belong such symptoms as sudden changes in color (especially in the face), blushing, hot and cold sensations in the hands and feet, and nervous chills.

PLATE XIV — SKIN DISCOLORATIONS IN VARIOUS DISEASES

1. Jaundice
2. Cyanosis
3. Addison's Disease or the Brown Disease
4. Chlorosis (Green-sickness)
5. Discoloration resulting from chronic Silver-poisoning
6. Discoloration caused by chronic Lead-poisoning



The second group of symptoms is the one which is most conspicuous. The symptoms are those which are characteristic of the effects of alcohol and are due to the effects of alcohol on the central nervous system. The symptoms are those which are characteristic of the effects of alcohol on the central nervous system. The symptoms are those which are characteristic of the effects of alcohol on the central nervous system.

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9. *Self-Reflection* The sexual behavior of young people is influenced by growing youthfulness, such as maturation, etc., and it may be the cause of many problems, especially in the areas of sexual and emotional tendencies be present, or it may be a continuation of the previous behavior, which is practically done.

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2. **Cyanosis**
3. **Addison's Disease, or the Bronzed Disease**
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4. **Neurasthenia of the Stomach.** See STOMACH, DISEASES OF.

5. **Intestinal Neurasthenia:** Difficult movements, sluggishness of the bowels, formation of gas, and abdominal pains.

6. **Sexual Neurasthenia:** In *men*: premature ejaculations, impotence, abnormal sensations in the testicles, bladder, and sexual organs, as well as in the neck and legs, irritable feelings, and fixed ideas.—In *women*: excessive excitement, irritability, abnormal sensations in the pelvis, anxiety, and fixed ideas.

The treatment of neurasthenia always gives promise of success if begun early enough. Very often, however, the patient neglects himself until he has come to the point where the evil is too deeply rooted. And equally often, instead of going at once to a physician, he falls into the hands of some worthless, advertising quack. In all lands such men live almost entirely upon the credulity of neurasthenics. The trouble is not relieved, and the patient leaves one quack only to find another. It is really a neurasthenic patient's own fault if his malady drags on for years.

The first part of the treatment consists in giving the irritated and weakened nervous system all the rest it needs, as well as suitable nourishment which will restore it to a healthy condition. The patient should seek pleasant surroundings, among intelligent people; if possible, in a locality with plenty of fresh bracing air and sunshine, either among the mountains or in a region where pines are abundant. He should rest in the fresh air and sunshine; that is, take sun-baths and air-baths. The roads should be good and not too hilly, and the neighborhood should have diversified natural views. The food should consist of simple household-fare (no hotel cooking), with plenty of fruit, vegetables, good meat, and pure milk. It is very desirable that the place selected should be located in the neighborhood of a large town, so that the patient can take an occasional stroll through the streets when he feels so inclined. City people who develop neurasthenia can not be content to live without some city life. The climate should not be enervating or foggy. Water-treatment, massage, curative gymnastics, and the application of electricity are also of service; but the patient must devote several months to the entire treatment in order to be really helped.

NETTLE-RASH.—See HIVES.

NEURALGIA.—A nervous affection characterized by acute, spasmodic pains along the course of a sensory nerve. Although every form of pain is the result of a nerve-action (and, therefore, a nerve-pain) common usage designates as neuralgia, or true nerve-pains, only those pains which, without any visible and tangible cause, appear in the region of a sensory nerve. This does not mean that neuralgia arises without being attributable to diseases which either are localized in the painful part or affect the entire organism. Severe affections of the blood, infectious diseases (especially influenza, rheumatism, typhoid fever, and malaria), diabetes mellitus, and

injuries must frequently be looked upon as the causes of severe neuralgic disturbances. In many cases an injury may long precede the neuralgic attack. In the disease known as SHINGLES, neuralgia in the form of intercostal pain precedes the eruption of blisters, and often persists even after the latter has been cured. In this disease neuralgia is the chief affection; not the eruption. While an acute attack of rheumatic pains may be disagreeable enough, man usually grows most uneasy when afflicted with acute or chronic neuralgia.

It would seem natural that the patient would at once seek the services of a physician, who might be able to discover and remove the cause of the

disease; yet, it is a well-known fact that most patients try every plaster, ointment, essence, powder, and pill before consulting the doctor, and then expect him to help immediately, although the affection has in the meanwhile become chronic. Many people will spend large sums of money in worthless experiments, and when they finally go to the doctor the disease has become so persistent that it can be treated successfully only with great difficulty.



FIG. 295. Nāgeli's head-stretching manipulation.

treating the *symptom* of the disease. In a number of other articles advice has been given as to the treatment of various neuralgic pains. See, for instance, BREAST, PAINFUL AFFECTIONS OF; FACE, DISEASES OF; HEADACHE; MIGRAINE; etc. It remains, therefore, to describe only a small number of neuralgias under this heading.

Neuralgia of the teeth is a well-known affection. The pain, which often is all but unbearable, is caused neither by an affection of the teeth nor by one of the jaws; and in its purest form it occurs as "toothache of the pregnant." This pain may in many cases be removed as if by magic within one minute by bending the stretched head backward according to Nāgeli's head-stretching manipulation. As shown in Fig. 295, the palms of the hands are placed respectively under the chin and behind the back of the patient's head, whereupon the head is pulled strongly upward, and then bent backward as far as it will go. The patient remains in this position for about one to one and a half minutes, when, in most cases, the pain will

have disappeared. This treatment is especially efficacious in children and in pregnant women.

Neuralgic pains in the testicles may be relieved in similar manner by stretching the scrotum, provided that neither inflammation nor degeneration is at the bottom of the condition.

The intense pains which may torment young girls at the onset of menstruation often gives way to a hot bath of 100° F., of half an hour's duration (to be taken in spite of the menstruation).

NEURASTHENIA.—See NERVOUS PROSTRATION.

NEURITIS.—Inflammation of a nerve. This affection, which is of very frequent occurrence, gives rise to intense pain which increases when the affected part of the body is moved; the patient endeavors, therefore, to keep as quiet as possible. Inflammation of a nerve-trunk may be due to direct injury (by pressure), to colds, or to the action of poisons either formed in the body (as in syphilis, diabetes mellitus, rheumatism, gout, influenza, etc.) or introduced into the body (as alcohol, arsenic, lead, or nicotin).

Multiple neuritis sometimes appears as an independent disease (*beriberi*) accompanied with fever. It may attack a smaller or larger number of nerves; for instance, those of both legs, or those of the arms.

Treatment of neuritis consists in rest of the affected part of the body, careful embrocations, cupping, application of water and electricity, medication, regulation of the diet, and attention to the bowels. Caution should be given against incorrect and rough application of massage. The pains are successfully combated by certain medicines, compresses, etc.

NICOTIN-POISONING.—See TOBACCO-POISONING.

NIGHT-BLINDNESS.—See HEMERALOPIA.

NIGHTMARE.—An oppressive sensation experienced on awaking from a deep sleep, beset with horrible dreams. The dreamer feels as if his throat were constricted and a weight placed on his chest; the breath comes in gasps. According to the old story, a gnome or sprite which has found its way into the bed is the cause of the condition. It is more likely, however, that certain indulgences at table on the previous evening, a stuffy atmosphere in the sleeping-room from failure to open a window, or calcified arteries of the heart, are asserting their presence.

An early and moderate supper, fresh air in the bedroom, light blankets, lying on the side, deep inspirations, a foot-bath before retiring, and attention to the bowels, are usually sufficient to disperse the ghostly visitor, unless some cardiac irregularity has been diagnosed by the physician.

NITRATE OF SILVER (ARGENTI NITRAS).—A crystallized solution of silver in nitric acid; generally known as *lunar caustic*. It occurs as colorless and odorless crystals, having a burning metallic taste. Silver nitrate is used as a counter-irritant in many internal and external inflammatory conditions, especially such as are accompanied with ulceration. A weak

solution (about 4 per cent.) is used as a local astringent in certain throat affections, such as diphtheria, being applied to the inflamed mucous membrane. It is often of great service in eye diseases of the new-born, especially in gonorrheal affections. The dose of the salt is one-quarter of a grain. An overdose may cause fatal poisoning, marked by convulsions, paralysis, and respiratory difficulties. Common kitchen-salt, magnesia, bicarbonate of soda, soap, large quantities of milk, etc., are among the antidotes used.

NITRIC ACID (ACIDUM NITRICUM).—An extremely corrosive acid, pale yellowish in color, and giving off white fumes when exposed to the air. It is a powerful caustic to animal fibers, and is often used in the treatment of warts, corns, or other callosities. In cancerous or syphilitic ulcers it is likewise of service as a local application. Internally, nitric acid is sometimes used, greatly diluted, as an intestinal astringent and antiseptic. The dose, for this purpose, is from five to ten drops, given in a tumblerful of water. The accidental or intentional swallowing of nitric acid results in burning sensations in the gullet and stomach, excessive nausea and vomiting, great pain, cold extremities, small and weak pulse, contortions, and (almost invariably) death. Alkaline solutions should be given as antidotes, and copious quantities of olive-oil and mucilaginous drinks administered.

NOSE, ARTIFICIAL.—The formation of an artificial nose becomes necessary when a considerable portion of the nose has been destroyed by disease, such as lupus, cancer, or syphilis; or when a portion of the nose has been lost by injury. If the tip of the nose has been cut off accidentally, it may often grow on again if it be replaced at once and sutured on under medical care. Since cutting off the nose was a customary penalty in India, a method for replacing the same first developed there. A V-shaped incision was made in the forehead, and the flap lifted down to make up for the loss of the nose. A later Italian method consists in partly severing a strip of skin from the upper arm, which is then tied fast to the head, and the skin-flap sutured to the nose. Not until this skin has grown fast to the nose is it completely severed from the arm. Skin from the cheeks may also be used for the formation of a nose. Unfortunately, however, the final result is not always perfect, for the new nose has a tendency to shrink. After a year it may become insignificantly small. Of late it has become customary to use artificial noses made of celluloid. These preserve their shape and, used in conjunction with eye-glasses, can be so artfully contrived that the deformity is difficult to recognize.

NOSEBLEED.—In this affection it is important to determine in which nostril the bleeding began. In profuse bleeding this may often be difficult, since the blood runs from one side of the nose into the other. The first remedy used to stop the flow should be pure antiseptic cotton, which is packed firmly into the bleeding nostril. Then the patient should press externally upon the wing of the nose, forcing it against the dividing wall, the front

part of which is usually the seat of the hemorrhage. The application of cold plates or of cold compresses to the neck, drawing water through the nose, hand-baths, etc., are very unreliable remedies; on the other hand, it is advisable to hold the head very erect, and rather swallow a little blood than have the hemorrhage continue with the head bent. Profuse hemorrhages require the aid of a physician, who will look for the location of the bleeding, and also treat it after the cessation of the flow.

Nosebleed in children is generally caused by injuries, foreign bodies, or eruptions of the skin at the entrance of the nose; in adults it may result from heart-defects, from congestions, or from diseases of the interior of the nose. Nosebleed is sometimes a forerunner of some febrile diseases, such as measles, diphtheria, and typhoid fever. Old persons with calcification of veins and arteries may suffer from severe losses of blood which endanger life. Although nosebleed may occasionally afford relief to a patient, it is never a sign of good health, as the laity sometimes believe. Frequently recurring nosebleed may lead to chlorosis and loss of strength, as can sometimes be noted in the numerous hemorrhages of children affected by whooping-cough.

NOSE, CURVATURE OF.—A deformity which is due principally to a bending of the dividing wall of the nose. Slight curvatures are so frequent that they may almost be called the rule; and usually they cause no disturbances. More marked degrees of curvature prevent the free passage of air, and also change the external shape of the organ, so that it is either curved in its entirety or suffers a double deflection (the root being turned to the left and the tip to the right, or vice versa).

Curvature of the nose may result from blows, knocks, or falls; or it may be due to a disturbance of the growth of the facial bones. Slight injuries to the nose, leading only to insignificant hemorrhages, may fracture the delicate cartilage of the septum, or displace it from its groove. If medical aid be procured at once, it is possible, by packing the nose, to replace the deflected part of the septum without much trouble. It may, however, heal in an incorrect position, in which case special treatment may be required later. A child which, after an injury to the nose, breathes with difficulty through that organ, or suffers a change in the sound of its voice, should be carefully examined for possible nasal injuries and defects.

If the septum of the nose be bent in consequence of defective growth, it



FIG. 296. Aquiline nose.



FIG. 297. Saddle-nose.

is mostly due to an arch-like curvature of the palate. The so-called "aquiline" nose (see Fig. 296) is not caused by a deflection of the septum, but by projection of the nasal bones; and it does not necessarily cause disturbances of breathing. Depression of the septum in consequence of ulcerative processes (syphilis) gives rise to a so-called "saddle-nose." The bridge of the nose is broad and fallen in, the tip is raised, and the nostrils face slightly forward and upward (see Fig. 297).

NOSE, FOREIGN BODIES IN.—Many children have a habit of putting foreign substances into their nostrils. Paper-balls, shoe-buttons, beads, cherry-stones, leaves and flowers, grains of sand, small pencils, etc., have been found in the nostrils of children. Such practises should be energetically repressed by the parents. It sometimes happens that a child carries a foreign body in its nose for a long time, its presence not being noted until manifested by a bad odor and suppuration from the nose. When these symptoms occur in a child, it should be examined by a physician. The attempt of a layman to remove such a foreign body is usually unsuccessful, if not dangerous. Some foreign bodies may remain in the nose for some length of time without causing injury to health; but as soon as any manifestations of their presence become evident, a physician should be consulted.

NOSE, FRACTURE OF.—Violent external injuries (such as a fall or a blow) may lead to a fracture of the bony structure of the nose, either of the

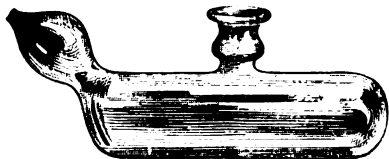


FIG. 298. Nasal irrigator.

bridge or of the lateral walls. As a rule, the internal mucous membrane of the nose is injured at the same time, causing nosebleed. Hemorrhage occurs also under the external skin, and after a short time the point of injury as well as the lower eyelids may swell

and become bluish-red. If a fracture of the nose be treated in time, it is often possible to straighten the structure of the nose from the interior. See also NOSE, CURVATURE OF.

NOSE-IRRIGATION.—A healthy nose with normal mucous membranes does not, as a rule, require any mechanical cleansing of its interior. The mucous membrane, by aid of its movable cilia (or hair-like processes), spontaneously ejects all unclean particles through the nostrils. The nasal mucus also acts as a cleanser and as a bactericide. The habit which many persons have of drawing cold, possibly dirty, water from the wash-basin into their nostrils, is superfluous, in fact harmful. Nasal irrigation should be practised only when prescribed by a physician, especially since awkward application may lead to inflammation of the ears. The following method of irrigation may be recommended: With the head bent back, lukewarm salt water (one small teaspoonful of salt to one pint of clean water) is poured slowly into the nostrils, so that the water flows drop by drop into the pharynx

(or back of the mouth). This may be done either with a pointed teaspoon or with a nasal irrigator, as shown in Fig. 298. Violent blowing of the nose after an irrigation may be extremely harmful.

NOSE, POLYPI IN.—Pedunculate tumors are of very frequent occurrence in the nose. They arise as a result either of a chronic attack of nasal catarrh or of a suppurative inflammation in the accessory cavities of the nose. A chronic destructive catarrh of the nose manifests itself to the patient by a difficulty in breathing through one or both nostrils, especially at night, so that the mouth must be kept open during sleep. This causes the mucous membranes of the mouth and pharynx to become dry, and the tongue and lips to become fissured. There arises a frequent desire to moisten the throat, and as a consequence the patient's rest is disturbed. Other consequences are a mucous obstruction in the throat, and a thick, snuffling voice, such as may be heard at the beginning of an ordinary cold.

The nightly disturbances sometimes increase to shortness of breath, and asthma; and the patient awakes in the morning without being refreshed by his sleep. He is tired, suffers from a sensation of heaviness in the head, and is disinclined to work. If suppuration be present at the same time, the patient discharges a yellowish, viscid, mucopurulent secretion from the nose, and may have to use from four to six handkerchiefs daily for months. When the handkerchiefs are dry they show stiff, yellow stains with greenish borders. Snuff and nasal irrigations are of no value in the treatment of polypi. They are readily removed, and a physician, if consulted in time, may even prevent their formation. The purulent catarrh is very amenable to proper treatment.

NOSE, RED.—A harmless, but often very disfiguring, affection of the skin of the face, caused by paralysis of the facial capillaries. It is characterized by a bright-red to bluish-red discoloration, which may extend over smaller or larger areas of the face. Sometimes only the tip of the nose is affected; in other cases also the sides of the nose are discolored; and in some instances the affection may extend to the middle of the cheeks, or even to the chin and to the lobes of the ears. The color disappears under pressure with a finger. In many cases the discolored areas show a smaller or larger number of delicate streaks which do not blanch under pressure. These streaks are the dilated capillaries of the upper layers of the skin. The color usually becomes darker and more distinct during rapid changes in temperature, after drinking hot or alcoholic beverages, after eating, and under emotional disturbances. In some rare instances, however, the color fades slightly during summer.

The immediate cause of the redness is, as already stated, a paralysis of the capillaries of the skin, which are thereby dilated and rendered unable to contract to their normal width. This paralysis of the blood-vessels may be due to various causes. It may be the result of a chronic inflammation

of the lower layers of the skin owing to an abnormal increase of secretion from the cutaneous oil-glands (stearrhea), which causes the skin to become thicker and to become covered with pimples and nodes; or it may be due to an impairment of the blood (chlorosis); or to wasting diseases (consumption); or to deficient nutrition. Slight grades of freezing also give rise to a similar paralysis of the capillary vessels, causing insignificant reddening of the skin, similar to slight chilblains on fingers or toes. This redness usually appears where some part of the dress (the veil, for instance) adheres closely to projecting parts of the skin (as the nose, chin, and lobes of the ears). In these places the circulation of blood is naturally slow and diminished.

Although red noses are frequently seen in persons addicted to alcoholic beverages, they can not always be ascribed to chronic alcohol-poisoning, but possibly to impaired nutrition and deficient circulation of the blood. There are, furthermore, a good many drunkards without red noses.

NOURISHMENT FOR THE SICK.—The great importance of diet as a factor in the treatment of the sick can not be doubted. In some cases it is one which is difficult to control, and every physician can give a number of personal experiences of a most annoying and at times even tragic nature to illustrate what disaster may be wrought by the well-meant blunders of devoted friends or the capricious desires of the invalid himself. It can not be too frequently or too strongly emphasized that the patient's food, no less than his medicine, should be dictated by the physician in charge of the case and that the latter's orders in this respect are no more to be disobeyed than those in regard to drugs. It is quite impossible that a person not equipped with the special knowledge of the physician, and uninformed by the study which he gives to each individual case, should successfully select food especially adapted to the particular conditions existing in that case. On the other hand, appetite and preference, which form a reasonably safe guide under normal conditions, may be so distorted by disease as to demand foods which the digestive apparatus is totally unable to cope with.

The attractive serving of food is of great importance; and in this respect the tact and good taste of the nurse come most potently into play in cases where it is difficult to get the patient to take nourishment. Even in health, the appetite and the digestion are both influenced to a perfectly appreciable degree by the appearance and serving of the food, and in illness this factor becomes a much more important one. A carelessly prepared tray, a soiled or rumpled napkin, a cup which has "slopped over" into the saucer, or any one of a hundred other possible defects or accidents, even merely a haphazard arrangement of dishes, may cause the invalid to turn away in disgust and miss the much-needed nourishment. The trained nurse has been taught, and the amateur nurse should learn, that such refusals on the part of the patient are not to be regarded as "notions" which are to be ridiculed

or chided, but are to be met by more care and thought in providing a really appetizing and dainty repast. No amount of pains is too great to lavish upon this point. If a glass of milk is brought, set it upon a pretty plate with a dainty bit of linen, instead of bringing it in the hand. If a fruit-juice drink is offered, attractive in color, serve it in a clear, thin glass so that it may delight the eye as well as the palate. On the other hand, if the article of food is a dingy gruel, put it in the prettiest china bowl that can be found, where its unpleasant appearance may be rendered least conspicuous, and something else agreeable to look at be at hand. All linen must be fresh and crisp, all silver polished. Dishes should never be crowded on a tray, and the quantity of food should never be so much as to discourage a weak appetite. A fresh flower or two brought in with a meal actually stimulates the appetite in many patients; and any little "surprise" or novelty will often prove marvelously efficacious in the childish state to which illness reduces most people. Occasionally a patient is revolted by the mere sight of food, and in such cases liquid foods may be conveniently taken through a bent tube.

The details of the patient's diet, although to be indicated by the physician, must naturally be left largely to the nurse; and it is therefore extremely important that the latter should have a sufficient fund of general knowledge of the subject, to apply correctly the physician's directions. Some knowledge of the chemistry of foods is essential, no less than an understanding of the chemical and mechanical processes of digestion. If the nurse has this knowledge she will understand that cooking does not render meats more digestible, but merely more palatable; and that the steak served to an invalid had best be rare, whereas starchy vegetables must be cooked for a long time, since otherwise the starch-grains will offer effective resistance to the digestive processes. She will know that the albumen of an egg is rendered most available by slight boiling or by thorough beating, and that the seasoning of food for the sick should be most delicately done in order to secure the desirable degree of stimulation. In case of fevers she will understand that the time for the most important meal of the day should coincide with that of lowest temperature, that food should not be given when the patient is likely to be disturbed or excited or tired in any way, and that only under explicit instructions from the physician should the patient be awakened from sleep to take nourishment. Such a nurse will not need an explanation of the reason for combating a suppurative or tuberculous process with forced feeding, for treatment by starvation in other cases, or for favoring a diseased stomach with food to be digested in the intestine.

The feeding of small children is almost as delicate a problem as that of the sick, and one more frequently neglected, especially after the first year of life. Yet, until the middle of the third year children should have a diet differing from that of their elders; and even after that period they should

not be allowed to take highly spiced or seasoned foods. When graduating from the breast or the bottle, healthy children may begin to take soups, eggs, bread, and zwieback or some hard crackers especially manufactured for this purpose, and also mashed potatoes and other vegetables such as spinach, cauliflower, and asparagus tips. They may also be gradually introduced to beef, mutton, chicken, etc. Home-made fruit juices, prepared from fresh fruit with the addition of a little sugar and water from an unimpeachable source, may be enjoyed from the end of the second year; but tea and coffee had best be omitted, although many use them after the fourth year without detriment if diluted with milk to a degree which practically leaves nothing of the tea or coffee but the idea. *It is hardly necessary to insist upon the avoidance of alcoholic drinks of any sort for children. For a suitable bill of fare for young children, see **HEALTH-CARE OF CHILDREN**.

Some rules for the preparation of foods for the sick are appended here, as such a list may prove useful both to physician and to nurse. The former, when anxiously asked, "But, doctor, what shall I give her to eat," is often at a loss to answer save in the most general terms, whereas with the suggestions here at hand he could in a few moments prescribe the proper diet.

Milk probably heads the list as an important food for invalids, although in some diseases it is distinctly contraindicated. It is readily and almost entirely absorbable; and in mild cases of exhaustion it is well administered by boiling it with an equal quantity of water and giving it slowly. Milk should always be given slowly, and not gulped down, as it ceases to be a liquid when taken into the stomach; and the curd which forms there, if very bulky, is difficult for a weak stomach to manage. In case of nausea, also, it is less apt to be rejected if given slowly, a spoonful at a time. The addition of lime-water or bicarbonate of soda tends to prevent the formation of curd, and may be of assistance in some cases. The preparation of the milk and the amount to be given are determined by the physician in charge of the case, but in general he will deem it safest, where the patient is depending largely on milk, to have it Pasteurized or sterilized.

Sterilized Milk.—Milk is sterilized by being poured into clean bottles, which are plugged with absorbent cotton and placed in a boiler holding sufficient cold water to come three-fourths of the way up on the bottles. The bottles, which must not touch each other, may be placed in a wire basket divided into compartments and made to fit into the boiler so that the bottles can be readily lifted out. The water must be brought to a boil and kept at a temperature of 170° F. for ten minutes. Rubber stoppers are then substituted for the cotton plugs, and the bottles kept in a cool place until used. Any milk taken from a bottle and not used should be discarded.

Pasteurized Milk.—This is prepared by a process similar to sterilization except that the water is not brought to as high a temperature. See **NURSING, NOURISHING OF**.

Peptonized Milk.—Thirty grains of bicarbonate of soda and ten grains of pancreatic extract are thoroughly mixed in two tablespoonfuls of water, added to one quart of fresh milk, and kept warm in a covered jar for thirty minutes, then chilled. This tastes slightly bitter, and if the patient complains of this it may be sweetened.

Albuminized Milk.—A cup of milk, the whites of two eggs, and a pinch of salt, shaken together thoroughly and then chilled.

Milk Punch.—To one cup of milk add a little sherry, brandy, rum, or whisky (usually about a tablespoonful), and grate in a little nutmeg. Sweeten to suit and shake well together. This may be given either hot or cold.

Bonnyclabber.—This is simply milk which is allowed to stand undisturbed until it has curdled to the consistency of custard. It is sometimes much relished, and is decidedly beneficial. It must be "set" in a small and attractive dish, as it is eaten from the same dish; and whipped cream or the beaten white of an egg makes a pleasant addition.

Kephir and Kumiss.—See special article under this heading.

Junket.—For junket the milk must be lukewarm, sweetened to taste, and flavored. To this is added junket tablets dissolved in cold water, in the proportions of one tablet in a tablespoonful of water to a quart of milk. Like bonnyclabber, junket should be set in the mold from which it is to be eaten, as serving it from a large dish detracts from its appearance and consistency. A little brandy may be used in place of flavoring.

Custard.—Use one egg to a cup of milk, and about two tablespoonfuls of sugar, as desired. Beat the egg well before adding it to the milk, and see that the sugar is quite dissolved. Pour into individual molds and cook in a steamer until of the desired consistency. Grate a dusting of nutmeg on the tops and cool.

Egg-nog.—This can be served in greater variation than almost any other milk and egg food for invalids. A good rule is to use an egg to half a pint of milk and a tablespoonful of sugar, with two tablespoonfuls of wine or one of brandy. Fruit juices may be substituted for the wine, and the egg-nog may be made either hot or cold.

Treacle Posset.—To a pint of boiled milk add two tablespoonfuls of molasses. Let the mixture come to a boil, strain, and serve.

Pap.—Thicken the milk slightly with a little flour, corn-starch, or arrow-root, and boil for ten minutes. The white of an egg may be beaten in if wished.

Plum Porridge.—Chop fine a dozen raisins, put them in a pint of milk and let it come to a boil. Stir in a teaspoonful of corn-starch which has been stirred up in a little cold water, let it boil five minutes more, strain and serve. This will be found useful in diarrhea.

Gruels.—Gruels may be made either with water or with milk, the latter of course being more nutritious. They must always be thoroughly cooked,

as only by so doing is the starch which they contain rendered digestible; and in conditions of inflammation they should be used only with the greatest caution.

Oatmeal Gruel.—This is made by boiling two tablespoonfuls of oatmeal in a quart of water for forty-five minutes and then straining it. If too thick, more hot water may be added. It is a good idea to soak the oatmeal overnight in about twice as much water as there is oatmeal, then boil it in this same water, add boiling milk, mix thoroughly, and boil a few minutes longer. Other cereals are used in the same way; and arrowroot, for instance, makes an excellent gruel for an irritable stomach. All that has been said as to the necessity of thorough cooking of gruels applies equally well to the thicker "mush" prepared from cereals. The various cream soups belong with the mushes in the list of semi-solid foods, and if properly prepared are a valuable addition to invalid diet. It is better that the milk should be heated without actually boiling, as that renders it constipating; and the flour used for thickening must not be cooked with the butter, as this addition of fat makes the starch much more indigestible.

Beef is of all meats the main dependence in one form or another for invalids, and often it is advisable to give it raw. To disguise the unpleasant appearance many devices have been used. Among these, scraped-beef sandwiches are the simplest. The meat is cut into strips and scraped with a dull knife, leaving the connective tissue. The scrapings are well salted, and spread between thin slices of bread and butter. They may also be formed into small balls, lightly broiled, and served on toast.

Beef Tea.—This is valuable if it is understood that it is stimulating instead of nourishing, and only to be used when its legitimate effects are desired. It is made by cutting fine a pound of lean beef and soaking it, closely covered, for an hour or more in cold water, whereupon it is to be slowly heated to the boiling point, and allowed to simmer for at least two hours more. The "tea" may then be strained and seasoned. Any trace of fat must be scrupulously removed; and if desired, the white of an egg may be beaten and stirred in, re-straining afterward.

Beef Essence.—The meat, finely minced, is put into a stone-jar which is closed securely, and set in a kettle of cold water. This is slowly brought to a boil and kept boiling for three hours. The essence is then strained, seasoned, and flavored with celery, bay, or clove to suit the invalid. If desired, a pint of cold water may be put in the jar with the meat and the same process carried out, stirring the mixture frequently.

Peptonized Beef Tea.—This should be made in small quantity only, as it must not be kept from one day to the next. Half a pound of finely minced lean beef is put in a glass dish with ten grains of pepsin and three drops of dilute hydrochloric acid. Cover and keep in a warm place, at a temperature of about 90° F. for two hours, with repeated stirrings.

Beef Juice.—Unlike beef tea, this is highly nutritive. It is prepared by lightly broiling lean beef over a very hot fire, just enough to heat it through, and turning often. The beef is then cut fine and the juice pressed out in some way. An ordinary lemon-squeezer may be utilized for this purpose. The juice may be heated for serving by setting the dish containing it in a basin of hot water, but it should never be made hot enough to coagulate the juice. It may also be diluted with hot water. Any of these “teas” and juices may be served cold if desired, or even frozen, by packing in ice and salt and stirring them frequently.

Beef tea is combined with more nourishing foods in various ways; and what is known as *Bartholow's food* contains all the necessary elements for the nutrition of the human body. It is made by adding to a cup of milk, in which an ounce of sago has been soaked for ten minutes, a cup of beef tea, the beaten yolk of an egg, and celery salt to season.

Mutton and veal generally appear in the invalid's diet in the form of broth. Broths are made by cutting the meat small, covering it with cold water, and bringing it gradually to a boil over a slow fire where it is allowed to simmer for several hours, whereupon the broth is strained and skimmed. Cereals, rice or barley, may be added. Chicken broth is best made from the older fowls which are less in demand for other purposes.

Oyster-Juice.—This is much relished by some patients. It is made by mincing the oysters, in which a silver knife should be used, and putting them in a stone-jar which is then placed in hot water for half an hour. The liquid is then strained and seasoned to taste. A broth may be made by adding cold water to the oysters before putting the jar in the hot water. Oyster soup, made as usual with milk, is also good, and whole raw oysters figure prominently as a convalescent food.

Clams.—Being tougher than oysters, clams are seldom used except for broth, which is served hot or cold or in a thickened milk soup. The broth is made by cooking clams (which have been thoroughly cleaned) in a very little water until the shells begin to open, when the liquid is strained and seasoned.

Jellies.—These have always been a traditional delicacy for the sick, and can be prepared in many attractive ways, from both fruit and meat. Wine, cider, and various fruit juices may be used with gelatin; all in much the same way. Rules for proportions are invariably furnished with the gelatin; but it may be noted that the latter should be first dissolved in hot water, and half a box of gelatin or two tablespoonfuls of the granulated form will be sufficient for three and a half cups of liquid.

Chicken Jelly.—This is made precisely like chicken broth, but is undiluted and allowed to become solid. It should be set in pleasing molds, and a little of the chicken meat may be included in it, if the patient is allowed to have it.

Even *bread* may be served as a jelly by toasting brown the inside of a loaf, soaking in boiling water with a little lemon, then boiling, straining, sweetening, and chilling.

Toast.—When prepared for an invalid this should be made from stale bread with the crust cut off, and toasted slowly, so that it is crisp all the way through. Stale bread heated in the oven until brown is known as dextrinized bread. The “pulled bread” frequently ordered for those who are on a diet may be prepared at home from a loaf of loose texture by taking off the crust and tearing the inner portion into strips with as little pressing as possible. These strips are laid on a paper in a pan and put in the oven until crisp and golden brown. It is a fixed rule that invalids must never eat freshly baked bread, and if bread for their use is made in small loaves its thorough baking will be more easily secured with the killing of all yeast.

Of drinks for the sick there are legion, some nutritive, some soothing, and some merely cooling and thirst-allaying.

Fruit Juices.—If prepared at home, so that their ingredients are unquestionable, fruit juices may be used to advantage; and as many of them lack the desirable acidity they may be added to ordinary lemonade. This latter is correctly made by using for sweetening purposes a sirup which may be made by boiling a cup of sugar for ten minutes in two cups of water. This is used with the lemon-juice in the proportion of two to one, and about six tablespoonfuls of the mixture to one cup of water, plain or mineral. Next to the lemon-juice, orange-juice, and grape-juice are most frequently used. The last-named can be prepared in large quantities and put up in fruit-cans for future use. To do this, wash the grapes and place them in a preserving-kettle with cold water enough to cover them. Let them cook until they come to pieces, then strain through double cheese-cloth, put back on the fire, sweeten to taste, bring to a boil, and seal up in the fruit-jars with the same precautions used in canning other fruits. This juice will need to be diluted for drinking.

Flaxseed Lemonade.—This is a very soothing drink in cases of sore throat, and is made by steeping six tablespoonfuls of whole flaxseed for an hour in a quart of water with four tablespoonfuls of sugar. The water should be boiling when the flaxseed is put in. Strain out the flaxseed, add the juice of two lemons, and chill.

Barley-water.—Three tablespoonfuls of barley are soaked overnight, a quart of cold water added on the following day, and the whole boiled for an hour and a half. Strain and add salt, sugar, and lemon-juice to taste.

If the physician orders *imperial drink*, add to a pint of boiling water one-fourth of an ounce of cream of tartar, the juice of half a lemon, and a tablespoonful of strained honey. Sifted sugar may be substituted for this last ingredient.

Albumen Water.—This is an extremely useful drink, as it is very easily retained and can be taken by the weakest patient. It is made by beating well the white of an egg and mixing with a cup of ice-water and a little salt or sugar. Fruit juices may be used as flavoring, and the proportion of egg-white to water may be doubled if advisable.

These are only a few of the foods and drinks especially suitable for the sick, but enough have been given to be of service and to suggest other adaptations.

NURSING.—To nurse the new-born baby at the breast is not only the natural thing to do, but is most beneficial to both mother and child. The supposition that anemic women are weakened by this additional demand upon their strength does not apply to all cases. The human organism is not a mere receiving and expending mechanism, but a highly complicated chemical laboratory in which, by the combination or separation of chemical elements, not only new combinations are formed, but in addition all sorts of forces are bound or set free.

In most women nursing awakens many forces that formerly were sluggish or latent (for instance, blood-formation), with the result that the mother, after several months of nursing, is fresher, happier, and more full of life than ever before. There are certain forms of anemia which become aggravated by nursing; for instance, those caused by distinct organic diseases, as by consumption. In addition to the results already mentioned (among which must be included the rapid recovery from severe hemorrhage at giving birth), a more rapid and thorough involution of the abdominal viscera takes place; the womb and the ligaments decrease in size, and recover their original compactness, elasticity, and tension; and there is a decrease in the lochial discharge. The abdomen is less distended and flabby. On the other hand, in a woman who does not nurse her child, the organs remain swollen, and menstruation is increased, causing not only catarrhal lochial discharges, but also bodily weakness, anemia, nervous debility, migraine, stomach trouble, indigestion, etc.

The results of raising the infant on cows' milk or other substitutes for mother's milk are even more critical for the child than for the mother. Such children are more restless, suffer from flatulence and constipation, scream a great deal, and suffer (especially in the summer-time) from serious intestinal catarrh. They also take on flesh more slowly, in spite of larger quantities of nourishment, gaining, on an average, only five-sixths of an ounce daily instead of one ounce during the first two months; later only two-thirds of an ounce daily.

Infants brought up on artificial foods are apt to show less resistance to contagious diseases, not only during infancy, but even in later life. They are especially non-resistant to children's diseases and to tuberculosis. It is a question whether anemia, weakness of the digestive organs, and similar

troubles, may not be the result of insufficient and improper feeding. Mother's milk is not so essential for very robust children.

Artificial feeding will have better results if the infant gets the breast once or twice a day; for mother's milk contains certain elements which aid digestion. Considering all these advantages, it is morally wrong in a mother not to nurse, or partially nurse, her child, unless she has very good reasons for refraining from so doing. Mothers who have not sufficient milk on the third or fourth day after confinement should give the child what they have; the quantity very often increases. In cases where there is an abundance of milk, and where nursing, for some reason or other, is done only partially, it is not necessary to stop nursing; for a diet poor in liquids and in sugar will soon decrease the quantity. The total repression of milk is more difficult. Bandages from shoulder to shoulder, rubbing the breasts with warm fat, and mild purges (Carlsbad salt) are good remedies for alleviating tension.

A scant secretion of milk is not a good reason for not nursing the infant. A proper diet (plenty of milk, eggs, sugar, and pastry), and massage of the abdomen to stimulate the circulation from the abdomen to the breasts, excite a greater secretion of milk.

In the first few days following childbirth the milk is thick, yellow, and rich in salts which act as mild purges on the child. This purgative action is desirable in order to throw off quantities of meconium which are present in the intestine. The child should be put to the breast as soon as the mother has recovered from the exertions of childbirth; either on the day of birth or about twelve hours later. By this time the child will be thirsty and will scream. If the milk has not yet appeared, the child's sucking will aid its coming. If the child be not satisfied, it may be quieted with a small quantity of sweetened water. While nursing, the mother experiences decided after-pains, a sign of the contraction of the womb. During the first few days the child drinks at intervals of from two to four hours, a little later it drinks every three hours, and later still every two and a half hours. At night a long interval should elapse, namely from 11 P.M. to 6 A.M. In the beginning the infant tires readily; its one-sided position in the mother's arm is uncomfortable, sucking is painful, and neither mother nor child is at ease. All this makes nervous women very impatient. When nursing a child the protruding breast must be kept from the child's nose, held away with two fingers, and the nipple brought in contact with its mouth. If one breast has been emptied, and the child is still thirsty, it may be put to the other breast.

Cleanliness in nursing is an essential for both mother and child. In the child it prevents infections of the mouth, and intestinal catarrh; in the mother it prevents inflammation of the breasts. The nipple must be freed from all crusts, and after each nursing it must be cleaned with absorbent

cotton and a boric-acid solution. During the intervals between nursing it must be kept covered with clean cloths or wads of cotton. A nursing-corset may be useful. These rules for cleanliness should be observed also during pregnancy, and, besides, the nipples should be hardened so as to ward off possible inflammation of the breasts. It is wise to draw the nipples forward carefully with the hand, and apply cold water to them. After nursing, the child's mouth should be carefully washed with absorbent cotton dipped into a solution of boric acid.

In spite of every precaution the nipples may become inflamed by being bitten by the child, especially if they be flat. In such cases it is well to use a nipple-shield as a protection; this will also make nursing easier for the child. This nipple-shield must be boiled every day, and should be kept in a boric-acid solution when not in use. The glass opening must be sufficiently large to allow the nipple to recede. As a rule infants do not at first like a rubber-nipple, but they soon become accustomed to it. In cases of receding nipple a rubber-nipple is absolutely necessary. If the child's mouth, as well as the nipple, be clean, inflammation is not likely to occur, even when fissures exist. Such fissures are very sensitive, and may be extremely painful. The nursing mother should invariably call the attention of her physician to this. The infant should be nursed for from nine to fifteen months if possible, and efforts should be made always to nurse it in summer, as artificial foods spoil rapidly in hot weather. Nursing for too long a time, however, weakens both mother and child. Weaning should not be done suddenly, but should take place gradually during several weeks, by giving the breast less often to the child. The milk should be dried up gradually; to drive it off abruptly is not necessary. There is no such thing as "milk going to the head." Disturbances which are ascribed to this fact are really caused by some sickness.

Good reasons for early and sudden weaning may arise by reason of the mother's health (increasing anemia, consumption, syphilis, diabetes, mental derangement, epilepsy). Severe forms of liver, heart, or kidney trouble are only secondary reasons. Other reasons for discontinuance of nursing are: tender, fat, inflamed, or fissured breasts; insufficient or unfit milk (salty; lacking sugar); continuous "milk flow"; certain changes in the sexual organs; continuous bloody lochia; puerperal fever; and pregnancy. As far as the infant is concerned it should not be nursed if there are swellings, deformities, or other diseases of the mucous membranes of the mouth and nose (harelip; cleft palate), or excessive weakness on account of premature birth. Such infants must be fed with mother's milk by a spoon. An infant's seeming inability to take the breast may really arise from disinclination, especially if it was fed from a spoon during the first few days. Such a possibility should be borne in mind.

The symptoms caused in mother and child on account of insufficient

secretion of milk are as follows: The mother has sensations of pain in the breasts, and especially in the back between the shoulder-blades. She has headache, dizziness, a certain sensation of "emptiness" in the head, poor memory, loss of appetite, excessive thirst, loss in weight, heart-palpitation, fatigue, and continuous bloody lochia. The child does not increase sufficiently in weight (may even lose weight), is restless, cries often, and suffers from constipation or diarrhea (the stools being green), flatulence, insufficient or abnormally increased urination, and skin-diseases.

When the breasts are large and the child loses in weight, it is possible that the glands are fatty and give no milk at all. Furthermore, milk which was of good quality at the beginning may deteriorate by reason of changes in the mother's habits. The milk-secretion may be disturbed by increased attention to social duties, by psychical excitement, and by the ingestion of spices, alcoholic beverages, certain vegetables (rhubarb, asparagus, onions, etc.), and indigestible foods or medicines which cause flatulence and skin-eruptions. Indigestion caused by the appearance of menstruation during the period of nursing may also be a contraindication of nursing. Such a condition may be brought about by carriage- or train-rides. The child's weight should be taken once a week in order to see whether its weight increases at the normal rate; and all conditions which tend to deteriorate the quality of the milk should be avoided. An excessive flow of milk usually goes hand in hand with an inferior quality; the child remains hungry in spite of overfeeding, and becomes ill.

During menstruation the milk is always poorer in quality, causing the child to suffer from intestinal trouble (green stools) and to become restless. But as the milk generally improves, it is not necessary to interrupt nursing or to wean the child. There are cases in which nursing may continue without harm during the first half of a new pregnancy. Nursing mothers may become pregnant without the appearance of menstruation. Sexual intercourse had, therefore, best be discontinued during the nursing period, it being often the reason for the too early reappearance of the menstrual flow.

NURSING OF THE SICK.—See SICK, NURSING OF.

NURSING, CARE OF.—The new-born, mature infant averages from 49 to 52 centimeters (19.6 to 20.8 inches) in length, and weighs, on an average, 3,200 grams (7 pounds); the weight is rarely more than 4,000 grams (8.8 pounds), and only very exceptionally 5,000 grams (11 pounds). The skin of the infant is pinkish-white at birth, and covered with a cheesy smear. Shoulders and face have a close covering of soft, downy hairs (*lanugo*) which fall out during the first days of life. The head is covered with dark hairs. The nails are hard and fully developed, extending over the tips of the fingers and toes. In boys the testicles can usually be felt in the scrotum. The average circumference of the head is 34 centimeters (13.6 inches).

Immediately after birth the infant cries with a loud voice, and discharges urine and a blackish-green substance, the *meconium*.

The immature child is smaller and lighter than the mature infant, and usually has the appearance of a little old man. The body is entirely covered with lanugo, and the nails are imperfectly developed. It cries with a voice which is scarcely audible, and its body-temperature is usually low (95° to 93.2° F.). The pulse can scarcely be felt. Respiration is weak, and often greatly or entirely impeded by mucus which is located in the air-passages, and which, owing to the weakness of the infant, can not be coughed up. If respiration can not be induced by external irritants (striking the baby's buttocks, dashing it with cold water, or pouring cool water over it while it is in a warm bath), artificial respiration should be practised.

Care of the navel-string is of the greatest importance. When the umbilical cord has been tied and severed, a longer or shorter stump remains suspended from the child's body. This remnant must be treated with the utmost care after every bath, which must be given only in absolutely clean water, and in a tub which is used for no other purposes. The cord is dressed with absolutely clean linen or antiseptic gauze, being previously dusted with a dry antiseptic powder. It is then held in place by an abdominal binder, 2 to 3 inches in width. The umbilical stump soon dries up, and falls off between the third and tenth days, leaving a depression or scar (the *navel*) which is covered by a thin, delicate skin.

Immediately after the ligature of the umbilical cord, the infant should be given a warm bath, of a temperature of 95° F. This serves to remove the cheesy, smeary substance, and to cleanse the pores of the skin. Such a bath should be given every day during the first year of life, and should be omitted only in case of sickness or certain insuperable difficulties. The temperature of the bath may be gradually reduced to 85° F., thus aiding in "hardening" the child's body as a protection against colds. Particular attention should be paid to the cleanliness of the hairy part of the head, of the armpits, of the groins, and of the region of the anus. The temperature of the room in which the daily baths and washings (which include also a daily cleansing of the eyes with cotton-tufts and fresh, pure water) are given, should be at least 61° to 63° F. The washings are best made with pieces of clean absorbent cotton, which can be thrown away after use. If a sponge be employed, it must be well cleaned after every use, and should be frequently boiled. A separate sponge must be used for the face. In the bath, and also when being carried, the baby should be held in such a manner that one hand supports the head, the other the buttocks. Any other method of carrying (for instance, holding the infant under the shoulders) is faulty, and harmful to the infant's body (see Figs. 299 to 302). After the bath the soap which may adhere to the body should be thoroughly rinsed off, whereupon the infant should be dried rapidly and carefully with heated towels.

An examination of the baby with reference to congenital defects or deformities may be conveniently made during its first bath. The mother should not be frightened by the presence of a so-called "head-tumor," which consists of an accumulation of lymph and blood, either under the hairy part of the head or in the face, which may appear greatly distorted thereby. This tumor is caused by the pressure of the head in labor, and disappears in a few days without any interference. Pressure-areas are also occasionally seen on the head, especially upon the parietal bones. They consist of round or oval areas of skin, which are either reddened and slightly



FIG. 299. Incorrect manner of holding the baby.

FIG. 300. The proper way of holding the baby.

depressed, or show a gray discoloration with a red areola. The skin of these areas rarely mortifies. If it does it turns black, a brief suppuration setting in when the mortified parts have fallen off. This condition, however, is easily treated by the physician.

When the baby awakes from the profound sleep into which it invariably falls after its first bath, it will cry. This cry is the sign to give it its first meal. At this time the mother should not listen to the advices offered by grandmothers, aunts, and other women, concerning sirups, teas, and sugared water; but she should put the infant to her breast on the first day. After a few drops of milk have been pressed out, the baby will soon suck vigorously at the nipple placed in its mouth, unless it suffers from congenital defects of mouth or nose which render sucking impossible. Following this first, usually unsatisfactory meal, it may be necessary to give the infant a little sweetened water. With regard to manner and frequency of

feeding, see NURSING. When the infant has nursed for from 15 to 20 minutes it should be placed carefully upon its back in order to avoid eructations (often mistakenly induced), as well as the inclination to vomit. Spitting or vomiting of food immediately after nursing is usually a sign of over-feeding.

The bowel movements of a healthy infant will number from two to five daily during the first few weeks after birth, if it has been nourished regularly. Later there will be from one to three movements a day. The excrements of healthy children form thick, adhesive, pulpy masses. In



FIG. 301. Faulty method of carrying the infant.

FIG. 302. Correct way of carrying the infant.

children who are fed on mother's milk they are yellowish in color and have a sour smell; whereas they are clay-colored (grayish-yellow) and slightly malodorous in babies fed on cows' milk.

Disturbances of digestion often give rise to an accumulation of gases in the baby's intestine. If the infant be healthy, these gases will readily escape through the anus; otherwise they may cause flatulence, distention of the abdomen, and colic. The baby then cries incessantly, distorts its face, beats with its arms, and draws its little legs up to the abdomen (so-called "internal spasms"). To remove these winds the baby should be placed on its back with the buttocks raised (see Fig. 303), and given an injection of warm water ($\frac{1}{4}$ to $\frac{1}{2}$ of a pint of water at 95° F., and one tablespoonful of oil). Very small infants may be placed with the abdomen upon the palm of the hand, which slightly presses the abdominal walls, causing the gases to escape. Constipation (absence of bowel movements) not

infrequently occurs during the first weeks of an infant's life; in some cases even during the first days. The feces are then discharged only every second or third day, or still more rarely. They consist usually of hard, round balls which are bright-yellow in very young nurslings; darker in babies that are several weeks old. An infant suffering from constipation has a hard, distended belly, which is painful even to the slightest touch; and the skin is usually hot. If the infant remain constipated for some time, urina-



FIG. 303. How to give the baby an enema.

tion becomes disturbed, and high fever sets in, accompanied by involuntary twitchings and even by fatal spasms. Insufficient fat (cream) in the milk, and painful fissures of the anus, are sometimes causes of such constipation in infants.

In breast-fed children constipation may result from insufficient food. An infant which is always constipated should receive food containing more fat, and a physician should be consulted as early as possible. If the stools are a little slower than usual, injections of warm water may be given with safety. They should not be given too often, however. Massage is a reliable remedy for babies inclined to constipation. The baby is placed upon

its back, and its abdomen greased with vaselin, lanolin, or other clean fats, whereupon rotary rubbing movements are made under slight pressure in a direction from the right groin to the arch of the ribs, thence transversely toward the left, and from the left costal arch downward to the left groin, thence completing the circle toward the right groin. These manipulations should be continued for from 3 to 5 minutes. It is advisable to have a physician show how to perform the massage.

The amount of urine passed soon after birth (provided no deformities of the external genitals be present) depends upon the quantity of food taken, and increases rapidly during the first ten days. At first it is dark and cloudy, but soon becomes clear and straw-colored.

Urinary disturbances, especially painful pressing or complete retention, may be caused by marked flatulence, or may be due to a growing together of the glans penis and the foreskin. Other causes of disturbances are narrowing of the prepuce in boys, adhesion of the small labia in girls, inflammation of the interior surface of the prepuce, vesical catarrh, and stones of the bladder. In cases of urinary retention the infant cries incessantly, perspires profusely, and draws its legs up to the belly. When flatulence is the cause of the condition, a warm bath of 95° F. is usually sufficient to give relief; or towels heated to 104° F., and frequently changed, may be advantageously applied to the region of the bladder. If these measures be not followed by the discharge of urine, a physician should be summoned without delay, as prolonged retention of urine may give rise to severe spasms and general systemic poisoning. If there is narrowing of the prepuce, or if the glans penis and the prepuce have grown together, the physician should treat this condition as early as possible (see **FORESKIN, DISEASES OF**). If this be not done the continued violent pressing may cause inguinal or umbilical rupture, prolapse of the rectum, or **HYDROCELE** (which see).

The infant's dress should consist of a flannel band, a white skirt reaching to the middle of the abdomen, and on top of this a woollen, knit or woven jacket. The buttocks, genitals, and thighs should be wrapped in a triangularly folded diaper. The flannel band should be long enough to reach twice around the baby's body, and should not be more than four inches wide. If brought up too high it may interfere with breathing. The band should be closed on the left side, preferably by stitching with needle and thread. If this can not be done, the smallest safety-pins should be used. The diaper should be made of soft cotton, about eighteen inches square, folded once. Knit diapers are light and elastic, and greatly to be recommended. Under the diaper, but never *inside*, may be placed a small quilted pad or a piece of waterproof material, in order to protect the skirts. The baby is thereupon wrapped in a flannel blanket which is fastened under the arms, and left open in the back. This blanket should be so

long that it may be turned up over the feet and legs and fastened at the height of the navel with safety-pins. This will keep the baby's feet warm, and yet allow it room enough to move its limbs. Swaddling-bands which prevent free movements of the limbs, as well as drawers made from waterproof material, are injurious to the infant's health.

The different garments should be changed at least once a day, and should be kept scrupulously clean. The diaper, of course, must be changed whenever necessary. A wet diaper should never be merely dried and then used again, for the urine may contain irritating substances which will cause redness and chafing, or even eczema on buttocks and thighs. Soiled diapers should be kept in a covered pail, and should be boiled and washed as soon as possible.

When the baby is about five months old it becomes able to sit up, and can be carried in an erect position. The flannel blanket is now discarded, and in its stead a short flannel petticoat with a cotton or flannel body (according to the seasons) is used. A white petticoat reaching far below the feet is generally used when the baby is carried out-of-doors. The feet and legs, no longer protected by the blanket, now require special covering. At first the feet may be covered with closely knitted woolen socks; later soft kid shoes and stockings of silk, wool, or cotton may be used. The change from long to short garments should not be made during cold weather.

The baby's resting-place should preferably consist of a stationary bed or basket; a cradle is not advisable. Beds made of iron, with a wire-spring bottom, and resting on casters, are most practical. In some of these beds the high sides are made to turn down so that the baby can be conveniently put to bed. On the other hand, when the baby is able to stand up, the high sides will prevent its falling out of the bed. It is wiser to purchase a bed which is large enough to last for several years.

The most suitable night-dress for a young baby consists of a diaper, a white shirt, and a flannel blanket which is long enough to be gathered in at the hem. This will prevent the baby from getting cold feet even if it kicks off the outer covering. The foundation of the bed should consist of a firm mattress, over which is spread a linen sheet. In order to protect the bed a piece of waterproof material may be placed immediately under the baby; or a layer of wood-wool or peat-moss wrapped in linen may answer the same purpose. The head should rest upon a moderately hard pillow. During the cold season the bed may be warmed with hot-water bottles, but these should be removed before the baby is put to bed. The infant should not sleep in the same bed with its mother. This bad habit may cause the sleeping mother to lie upon the little one and suffocate it.

Weakly infants, and children who are born prematurely, should be wrapped in cotton-waddings or, if the expense can be borne, placed in a so-called incubator in which the temperature may be kept uniform. Such

incubators are made of iron and glass, and supplied with contrivances regulating the constant circulation and moistening of the air. A uniform temperature of 86° to 95° F. should be maintained.

The infant's room should be dry, light, and easily ventilated; its temperature should be kept between 65° and 68° F. The air of the room should be kept free from contamination by tobacco-smoke, the odors of washing, smells from the kitchen, and the fumes of smoking oil-lamps. The bed should be so placed as to prevent glaring light from falling on the sleeping baby; if necessary a light curtain, which does not interfere with the admission of air, may be used. The sleeping child should be guarded against sudden, loud noises. The bustle of the streets, and other regular noises, will not disturb its sleep. Nurslings accustomed to system will get hungry at regular intervals, and will awake at such times. It is therefore advisable to feed the baby at certain fixed hours, even during its first days of life, and not to let its crying and restlessness induce one to feed it at irregular times. See also NURSING, NOURISHING OF.

Attention to the skin is of great importance in the care of an infant. Dirt allowed to accumulate on the skin will cause the formation of crusts and scurf, which become irritated and inflamed, secreting a foul-smelling pus. This, in turn, will give rise to small, globular, hard structures about the ears, on the throat, and on the nape of the neck. These become larger and larger, generally grow soft, perforate the skin covering them, and discharge a stinking pus which produces pustules wherever it is allowed to dry. If the mother persists in believing the silly prattle of neighbors who assert that these pustules constitute an "outlet for disease," and that the discharge of pus is beneficial to the baby, she may rest assured that her darling either becomes so weakened that it dies, or that the scurf prepares the soil for the dreaded disease generally known as SCROFULA (which see). Careful and frequent washing, using plenty of soap, will most effectually prevent diseases of the skin, and will also guard against the soreness which often arises when the baby lies in urine for some time. The treatment of this soreness is very simple. After washing the sore parts with soap and water it should be dusted thickly with fine talcum powder, obtainable at any drug-store. This should be repeated whenever the linen is changed. Small children often present numerous water-white pimples, especially in places which incline to profuse perspiration, such as the forehead. As a rule this symptom is not caused by disease, and does not require special treatment; but care must be taken that the babies are not kept too warm so that they perspire too much.

The condition known as "thrush" is an infectious disease in which the mucous membranes of the tongue, cheeks, palate, and gums show firmly attached, flat, white spots. These spots eventually spread; and, by becoming transmitted to the pharynx and gullet, and obstructing the

same, they may cause the death of the infant. Thrush always causes inflammation of the mucous membrane of the mouth, which becomes very sensitive, rendering sucking painful. In this way the nourishing of the infant is often rendered difficult. Insufficient cleansing of the mouth is very liable to permit the development of the affection. The mouth should be carefully washed once or twice a day (if possible, in the evening) with a pledget of absorbent cotton which is wrapped around the finger. If the thrush-spots be few they may be removed in this manner; but if they be numerous a physician had best be consulted. Under no circumstances should they be left untreated, on the erroneous assumption that they are harmless. Cloths dipped in sugared water or in honey should never be used for rubbing the tongue and gums of infants affected with thrush, as the use of sweets merely furthers the development and spread of the disease.

The nails of fingers and toes should be cut at regular intervals with curved nail-scissors. A nail-brush, which must not be too stiff, should be used to remove the dirt accumulating under the nails, as this dirt often contains the most dangerous generators of disease. The nail-brush should be frequently boiled. Many people harbor the foolish belief that the nails of little children should not be cut, but bitten off with the teeth, as otherwise the children "may develop into thieves." This belief, needless to say, is downright nonsensical.

During the first few weeks of life the hair seen on the baby's head at birth usually falls out, a new growth gradually taking its place. The new hair is generally light in color, but becomes darker by degrees. The hair should be brushed daily with a soft camel's-hair brush.

The baby's crying may be said to be its only means of exercising its lungs and of stimulating the blood-circulation; and a certain amount of this exercise is, therefore, conducive to health. An observant mother will soon know to distinguish between the healthy cry, which is loud and strong, and the cry indicative of pain or discomfort, which is generally sharp, spasmodic, whining, moaning, or weak, according to the degree of its trouble. When the baby cries one should always endeavor to determine the cause. It may be that it is hungry, but unless the regular interval has elapsed since its last meal it is wiser not to feed it until the proper time comes. Very frequently the opposite reason prevails, namely that the baby cries from being overfed. Constipation, flatulence, colic, irritation of sore spots by urine or feces, and various other factors may be causes of the crying.

When the baby cries without any apparent cause, it is sometimes wisest to let it keep on crying, especially if temper be back of it. The cry of temper is strong and enduring, and is accompanied by violent kicking. When the baby gets what it is crying for, it stops immediately. A prudent mother will not give in to this cry, or she will regret it later. Training can not begin too early. Babies who cry much and often had better be examined

by a physician, as it is possible that affections of the foreskin, umbilical rupture, indigestion, or other affections may be the cause, in which case prompt treatment is necessary.

Teething (dentition) usually begins during the latter half of the first year of life; in rare cases before the sixth month. The first dentition, so-called milk-dentition, consists of 20 teeth; 2 incisors, 1 canine, 1 bicuspid, and 1 milk-molar in each half of each jaw. In the healthy child these teeth appear with a certain regularity, and usually in pairs. Babies suffering from rickets generally get their teeth singly. The usual order of eruption of teeth is as follows: (1) two lower middle incisors; (2) four upper incisors; (3) two lower lateral incisors; (4) four bicuspid; (5) four canines; and (6) four milk-molars. The last teeth (the molars) usually appear between the twentieth and thirtieth months.

It is natural that a variety of affections may set in during the period of teething, and in many cases such disorders are erroneously ascribed to dentition. This belief often occasions delay in calling medical assistance, in consequence of which delay the lives of many infants are lost. Diarrhea is not a "beneficial complication" in teething, as is frequently maintained by old gossips; and equally absurd is the idea that shortness of breath, laryngeal catarrh, or bronchitis is due to the fact that the baby "cuts its teeth over its little chest." It is true that there are babies who become restless upon cutting the teeth, and who cry and refuse food; but these cases are generally rare, and the disquieting symptoms readily disappear. The restlessness and feverishness often ascribed to teething is very often due to faulty feeding. If the baby's gums swell and become hard, and if it manifest painfulness on pressure of the sore parts, it may be assumed with great probability that a tooth is about to come through. This cutting of a tooth, however, usually takes place very quietly; and on looking in the morning the mother will generally find the anxiously expected tooth projecting beyond the gums.

Certain enterprising persons, counting upon the narrow-mindedness of the multitude, succeed to an annoying degree in the sale of so-called "dentition-necklaces" which, by the alleged production of an electric current, are claimed to prevent teething-disturbances. In reality these remedies are nothing but expensive humbugs. In weak children, and especially in those suffering from rickets, dentition is usually delayed, in some cases until the second year of life.

When the baby has fever, this will manifest itself to the observant mother by redness of the head, by general unrest or by an unusual inclination to sleep, and by loss of appetite. It may be determined exactly by measuring the temperature with a thermometer, which should be introduced into the rectum for about an inch or two, the end introduced (that containing the mercury) being first greased with butter or vaselin. The thermometer

should remain in the rectum for from five to ten minutes (see Fig. 304). A temperature of more than 99.8° F. is always indicative of an affection, and calls for examination of the baby by a physician. It is usually best to have a doctor show the mother how to use the thermometer.

During the first two weeks of life the baby is scarcely influenced by external impressions. During the third week it begins to turn its eyes toward the light, and after about two months it can be quieted by song.



FIG. 304. Measuring the baby's temperature.

When between three and six months old, it begins to recognize its surroundings, and extends its hands for objects offered to it. At the age of seven months it is possible for the child to distinguish certain consonants and brief syllables, such as ma, pa, ta, boo, etc. Some precocious youngsters may even be able to answer to their names at this age.

The healthy baby usually begins to sit up when about four or five months old, and three or four months later it attempts to stand on its feet. The first attempts at walking are made when between ten and twelve months of age. Any essential divergence from these rules points to a morbid condition which requires medical advice.

The best toys for a small infant are colorless rubber-dolls which may be suspended in such a manner that the baby can reach them and swing them to and fro. Wool-covered animals may cause harm, if the baby gets some of the fluffy stuff into its mouth. Small objects which may be swallowed, and pointed or colored objects which may cause external injury or poisoning, should be kept away from the infant. For a more detailed account of the proper care of an infant, see Louis Fischer, *The Health-Care of the Baby*, New York, 1906.

NURSLING, NOURISHING OF.—The most natural food for the infant is the milk of its own mother (see NURSING). If, for any reason, the mother is prevented from nursing her baby, artificial foods must be considered. The best substitute for mother's milk is cows' milk, which differs from the former principally by reason of its higher percentage of albuminous bodies (casein). The amount of fat is about the same in the two kinds of milk; but cows' milk contains less sugar than does mother's milk. There is a further important difference in the circumstance that the casein of cows' milk is more difficult to digest than that of human milk. This is largely due to the fact that the casein of cows' milk coagulates in the baby's stomach in coarser masses than does that of mother's milk. These masses contain less fat in proportion to their size, and are more compact.

Cows' milk is exposed to contamination of various kinds from the time it leaves the cow's udder to the time it reaches the infant. These contaminations not only influence the quality of the milk; but they also menace the health and well-being of the infant. Aside from the coarse contamination by dirt from the stable and excrement from the cow, which in themselves contain countless bacteria, there is a constant danger that, with careless handling, the infectious micro-organisms of the most pernicious diseases may gain access to the milk. Thus, milk coming from a house in which a patient suffering from scarlatina is confined, may be the medium for the spread of this disease. Typhoid fever and diphtheria may be transmitted in a similar manner. In addition to these disease-germs, other micro-organisms may be imparted to the milk through improper handling during the milking, storing, transportation, or sale of the product. These bacteria may produce poisons in the milk, which can not be rendered innocuous even by long-continued boiling; or they may so irritate the nursling's stomach as to cause an inflammation of the mucous membrane of the intestine, leading to CHOLERA MORBUS, or even to death. The milk may, furthermore, have been exposed to harmful influences before leaving the cow, as when the animal suffers from some internal disease, or has been fed on injurious foods.

From this, as well as from other considerations, it follows that it is the urgent duty of every state, county, and city to pay strict attention to the management of dairies. The strictest possible laws should prevail, provi-

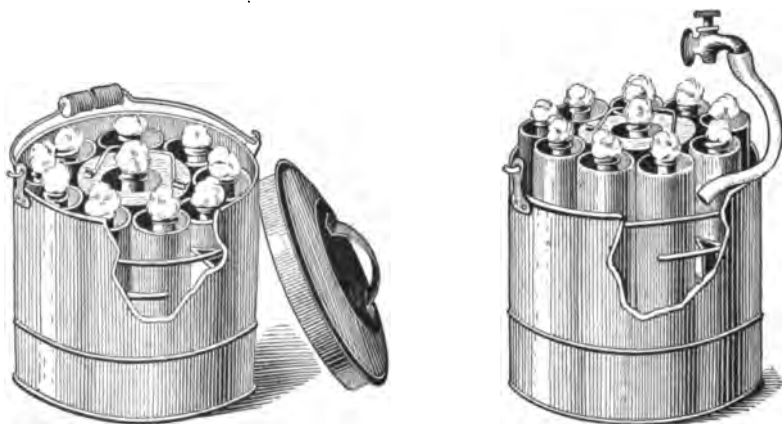
ding for the most careful inspection of all dairies, especially with reference to cleanliness, and to the health of cows and employees. The severest punishment should be meted out to proprietors of dairies from which contaminated or adulterated milk is being sold. In cases of recurrent infractions of the law, the revoking of licenses may be a necessary punishment.

Under the conditions prevailing in most of our large cities, it devolves to a great extent upon parents to assure themselves that their children are being fed only on milk which is obtained from cows that are absolutely healthy and properly fed, and which is being handled in the cleanest possible manner. It should also be taken into consideration that the milk of one cow is not as beneficial to the infant as the mixed milk from several cows. In spite of the greatest care and cleanliness, however, it is not always possible to obtain milk which is entirely free from germs. Raw milk, therefore, sooner or later becomes subject to decomposition and clotting.

To destroy the germs that cause decomposition, the best means is to boil the milk. Since simple boiling is not the best and safest method, special pots have been constructed, which render it feasible to keep the milk boiling for a longer period of time, and which prevent boiling over. These pots are made from heavily enameled sheet-iron, or from glazed earthenware, and are provided with close-fitting, perforated covers. If the baby's milk, which is boiled or Pasteurized (see next paragraph) as soon as it reaches the kitchen, is to be left in the pot until given to the infant, the pot should be kept in the refrigerator, and should be thoroughly shaken before the needed quantity is poured out, so as to distribute evenly the cream which may have separated to the top. The constant cleanliness of this milk-pot, which should not be used for any other purposes, must be considered by the mother or nurse to be one of her principal duties. When the pot has been emptied it should be scoured with sand, ashes, or a brush and hot water; and it should be boiled out every day, or at least twice a week, with a solution of soft soap (one tablespoonful to half a gallon of water). This boiling of the milk, and cleansing of the milk-pot do not prevent germs from entering the milk afterwards. A greater degree of security is offered by Pasteurization.

Pasteurization of milk consists in heating the milk to a high temperature, which is maintained for a period of 15 to 30 minutes. Special forms of apparatus have been recommended for this purpose. Simple Pasteurizers may be purchased in any large drug-store, Freeman's apparatus being one of the cheapest and most serviceable. This apparatus (see Figs. 305, 306) consists of a well-covered pot containing several compartments for the milk-bottles. The process takes place as follows: As many bottles as are needed are filled with milk, and closed with tufts of cotton, whereupon the pot is three-quarters filled with water by means of a hose attached to a faucet. The pot is thereupon covered, and brought to a boil, a temperature of

about 140° F. being maintained for about half an hour. This done, the rack holding the bottles is lifted out of the pot and immersed in hot water which may gradually be cooled until the milk has the desired temperature. The cotton-stoppers must never be removed until the milk is to be used, when the nipple, which has been carefully cleaned (preferably boiled), is immediately attached. When given to the baby the milk should be heated to 98½° F., the temperature of the body. Milk treated in this manner will not keep fresh for more than about 24 hours. A special advantage of this method is that the comparatively low temperature to which the milk is heated does not change the character of its casein, which remains more easy



FIGS. 305, 306. Freeman's Pasteurizer.
(Fig. 306 showing hose attached to faucet)

of digestion than as found in boiled milk. Nor does Pasteurized milk have the unpleasant taste of milk boiled in an ordinary pot.

The time of feeding should not exceed twenty minutes. If the bottle be not empty after this period, or if the infant vomit immediately after drinking, the amount of food should be diminished. On the other hand, if the baby drink eagerly and rapidly the quantity given at each meal may be gradually increased. Milk left in a bottle should not be warmed and used again, but should be thrown out at once. While the baby is being fed it should be held upon the left forearm of the mother or nurse, with its head slightly elevated, the nurse holding the bottle in her right hand. Older babies may hold their own bottles.

The bottles, as well as the rubber-nipples, should be kept scrupulously clean, and should be boiled frequently in a solution of soda (three dessert-spoonfuls to one quart of water), or in a soft-soap solution. Immediately after feeding, the bottle should be cleansed with hot water and a bottle-brush, whereupon it should be filled with water and remain standing until used again. The bottle-brush should likewise be boiled frequently, preferably every day. An entirely smooth bottle, without dents or ornaments,

should be used. Bottles that are graduated on the inside should be avoided, as any unevenness tends to collect dirt, thus permitting infection. Straight, cone-shaped bottles are most practical. The rubber-nipples should be smooth, and perforated with two holes. These holes should be so small that the milk will be prevented from running into the baby's mouth without suction, the object being to have the infant draw the milk from the bottle as from a breast. This causes the baby to become tired, and to fall asleep immediately after feeding. Rubber and glass tubing should be avoided as they can not be satisfactorily cleaned.

The quantity of food to be given to a baby in the course of twenty-four hours must be governed by the age and weight of the child. It is advisable to begin with a quantity of from 3 to 12 ounces during the first few days after birth, slowly and gradually increasing the amount to one quart at the end of the fourth month, and to half a pint more at the end of the sixth month. Sensitive infants may be fed at the rate of 5 to 6 ounces to every 2 pounds of their weight. A baby weighing 7 pounds should thus be given between 17 and 22 ounces of milk in the course of twenty-four hours; an infant of 8 pounds, between 20 and 24 ounces; and one weighing 10 pounds, between 25 and 30 ounces. The best way is always to begin with small quantities, and to increase gradually. A baby in good health may be given even larger quantities than those here mentioned.

The amount of proteins being about 3 to 4 times larger in cows' milk than in human milk, it is necessary to dilute the former in order to render it digestible for baby's stomach. In diminishing the percentage of albumin, however, the amounts of fat and sugar are also diminished. The loss of sugar may be compensated for by the addition of milk-sugar or cane-sugar at the rate of one teaspoonful to every three ounces of water added. The following formulas, taken from Dr. Louis Fischer's "The Health-Care of the Baby," are of value in showing the proper dilution of cows' milk for babies of various ages:

Formula No. 1 (for an infant from birth to one month):

Raw cows' milk.....	4 ounces	Divide into 10 bottles and feed every 2 hours.
Rice-water.....	16 ounces	
Granulated sugar.....	1 ounce (or 2 level tablespoons)	

Formula No. 2 (for an infant from one to two months):

Raw cows' milk.....	7 ounces	Divide into 8 bottles, each bottle containing about 3 ounces, and feed every two and one-half hours.
Rice-water.....	20 ounces	
Granulated sugar.....	1½ ounces (or 3 level tablespoons)	

Formula No. 3 (for an infant two to four months old):

Raw cows' milk.....	12 ounces	Divide into 7 bottles, each containing about 5 ounces, and feed every three hours.
Rice-water.....	23 ounces	
Granulated sugar.....	1½ ounces (or 2 tablespoons and one teaspoon)	

Formula No. 4 (for an infant from four to six months):

Raw cows' milk.	22 ounces	Divide into 7 bottles, each bottle containing about 5½ ounces, and feed every three hours.
Rice-water.	20 ounces	
Granulated sugar.	1½ ounces (or 3 tablespoons)	

Formula No. 5 (for an infant six to nine months old):

Raw cows' milk.	28 ounces	Divide into 5 bottles, each bottle containing 8 ounces, and feed every three and one-half hours.
Rice-water.	12 ounces	
Granulated sugar.	1½ ounces (or 3 tablespoons and 1 teaspoon)	

Formula No. 6 (for an infant from nine to twelve months):

Raw cows' milk.	27 ounces	Divide into 4 bottles, each bottle containing 8 ounces, and feed every four hours.
Rice-water.	5 ounces	
Granulated sugar.	1½ ounces (or 3 tablespoons and 1 teaspoon)	

Rice-water is made by adding one tablespoonful of rice to one quart of water, and boiling it for two hours, adding more water from time to time. When done, it should be strained through muslin, and enough boiled water added to make it measure one quart. If an inclination to diarrhea be present—that is, if the excrements are of a soft or thin consistency, readily separating in the diapers—it is well to use barley-water or oatmeal-water with the milk, instead of pure water or rice-water. The methods of preparation are the same as that given for rice-water. If a constipated condition prevails, sugar of milk should be used instead of cane-sugar, and the percentage of fat increased by adding cream to the mixture. This addition of fat increases the digestibility of diluted cows' milk, and renders it more like human milk in composition. Infants who do not thrive should always receive such an addition of fat in their bottles. Various cream-mixtures have been introduced, but these, as well as all specific directions for feeding infants, should be left to the attending physician to prescribe.

Experiments with buttermilk feeding have been made of recent years, especially in children whose digestive organs were not able to digest the amount of fat contained in ordinary milk or in mixtures of milk and water and cream. The results obtained have proved buttermilk to be an excellent food in certain disturbances of nutrition.

During the second half of the first year the digestive juices are secreted in the infant as in the adult, and feeding on cows' milk ceases to furnish the necessary nutritive substances, especially salts, iron, and phosphorus combinations. At this period it is advisable to commence the use of various flours in addition to the milk. A number of infants' foods containing the necessary salts are on the market, but the attending physician had best be consulted with regard to the choice of any of these. Ordinary ground zwieback, flour, or rice may advantageously be used for the preparation of a

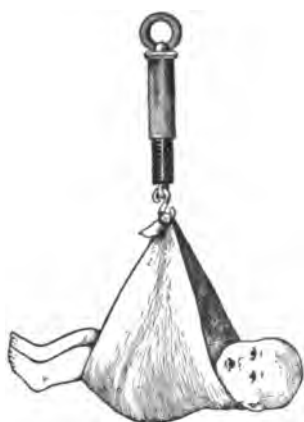


FIG. 307. Proper scale for weighing a baby.

pap. When the infant is old enough to take undiluted milk, it may also be given broths which contain the salts of meat; and the feeding then becomes a matter of careful observation and experiments with various foods. The first experiments with soup had best be made with a thin broth made of veal bones, with the addition of the yolk of an egg, a little salt, and one or two teaspoonfuls of meal. At this time most infants willingly take a crust of bread, a piece of zwieback, or a dry cake.

The growth of the infant must be tested at regular intervals by weighing it on a suitable scale (see Fig. 307). Most any scale will answer the purpose, except the dial-scale commonly used in kitchens, as these do not always give reliable results. The following table of weights may be useful in showing the progressive weight of a healthy baby which weighed $7\frac{1}{2}$ pounds at birth.

Age	Weight in Pounds	Age	Weight in Pounds
Weight at birth.	$7\frac{1}{2}$	Weight at 7 months.	$17\frac{1}{2}$
" " 1 month.	9	" " 8 "	$18\frac{1}{4}$
" " 2 months.	$11\frac{1}{4}$	" " 9 "	19
" " 3 "	$12\frac{1}{2}$	" " 10 "	$19\frac{1}{2}$
" " 4 "	$13\frac{1}{4}$	" " 11 "	$20\frac{1}{4}$
" " 5 "	15	" " end of 1 year.	21
" " 6 "	$16\frac{1}{4}$		

Under certain conditions, to be considered by the physician, it may be necessary to engage a wet-nurse. This is especially indicated when a baby fails to thrive on artificial foods, and the mother is unable to nurse the child herself. In selecting a wet-nurse it is of the greatest importance to the welfare of the infant that the applicant be carefully examined with regard to her health, and also that the condition of her own baby be considered. A wet-nurse should not be less than 20, nor more than 35 years of age. Her baby must be at least 10 to 13 weeks old, and well nourished. Upon repeated inspection it must show no sores whatever. The wet-nurse herself should be subjected to a careful medical examination, unless one would run the risk of exposing the baby she is to nurse to the danger of infection by syphilis, tuberculosis, or other contagious diseases.

NUT-GALL.—See GALLA.

NUTMEG (MYRISTICA).—The arils or shelled seed of the *Myristica fragrans*, or nutmeg-tree, indigenous to the Molucca Islands, but largely cultivated both in the East- and West-Indies. The seed is oval in form, grayish and furrowed externally, and yellowish with darker veins internally. Its odor is pleasingly fragrant, and its taste delightfully aromatic. The

medicinal properties of nutmeg depend upon the various oils which it contains; but it is not now used to any great extent, except as a means to disguise the taste of nauseating remedies. It is used also for its stimulating effects upon the appetite.

NUX VOMICA.—The seeds of the *Strychnos Nux-vomica*, a middle-sized tree growing in the East Indies. The seeds are little, flat disks, about an inch in diameter, and having a very bitter taste. Nux vomica depends for its action on the presence of two poisonous alkaloids, *strychnin* and *brucin*. Of these strychnin is the more powerful, and its action predominates. When taken in small doses, nux vomica acts like any other bitter tonic, increasing the flow of the digestive juices and improving the appetite. It also stimulates the special senses (as sight and hearing), rendering them more acute. Respiration and circulation are both stimulated by strychnin, and all the reflexes are rendered more active. Larger doses cause some muscular twitching, and an exaggerated sensitiveness to the slightest irritation. This is a manifestation of the predominant action of strychnin, an increase in the excitability of the motor portion of the spinal cord.

In poisonous doses the irritability becomes so extreme that any slight stimulation, such as the banging of a door or a draft of air, will cause violent convulsions. The body is thrown into an intense spasm, the back being arched so that only the heels and the head touch the ground; breathing is suspended, and the face is drawn into a horrible spasmodic grin, the *risus sardonicus*. There is some trembling, but no active movement after the muscles are set. The face becomes purple from the want of air. Consciousness is retained until death sets in, which usually results from asphyxia and exhaustion. In case of poisoning the stomach should be emptied as soon as possible, and tannic acid given. For the rest, the treatment consists in avoiding all irritation, and combating the convulsions with such depressants as bromides and chloral. Nux vomica is valuable as a bitter tonic, the tincture being given in doses of ten to thirty drops. Strychnin is used as a stimulant to the heart and respiratory apparatus, especially in heart-diseases, depressing fevers, surgical shock, poisoning by depressant drugs, etc., etc. The dose is about one-fiftieth of a grain.

NYCTALOPIA.—Term indicating a condition in which a person sees better at night than in the day time. It is sometimes due to central opacities of the cornea or lens, in which condition the power of vision would naturally become increased when the pupil is dilated, as occurs when darkness sets in. Day-blindness may occur also in some diseases of the retina, in which the central portion of the visual field is excluded while the external parts are visible. A similar condition is caused by tobacco-poisoning; and in recent cases of this affection abstinence from smoking generally suffices to effect a cure.

O

OAK-BARK.—See **QUERCUS**.

OBESITY.—A morbid accumulation of fatty tissue, which results in discomfort to the patient, if not actually constituting a diseased condition. A certain amount of fat is essential to good health; and it is not readily possible to express in figures at what point it commences to become harmful, as this depends essentially upon other conditions of the body. A muscular man is able to carry, without detriment, a much larger amount of fat than a person who is weak of muscle, and anemic. Affections of the heart, blood-vessels, kidneys, or joints cause a superabundance of fat to be dangerous.

Obesity is generally the result of eating and drinking more than necessary, or of taking too little muscular exercise; frequently both causes are combined. An inherited predisposition is also of great importance. One can not say that gluttony and muscular inactivity are always the causes of obesity, for there are persons who accumulate fat although they eat and drink very sparingly, and exercise as much as other individuals who have only an average amount of fat. In such cases it is a question of a morbid predisposition of the entire metabolism. This is especially the case in hereditary obesity, and is found also in persons suffering from wasting of the thyroid gland, and after castration (removal of testicles or of ovaries). Such forms of obesity are much more obstinate than those resulting from an unsuitable mode of living.

The external signs of obesity are well known. A man of average height will create the impression of being obese if his weight, including his clothes, exceeds 200 pounds; a woman who weighs more than 165 pounds usually appears fat. Weights of 275 pounds in men, and 220 pounds in women are by no means unusual. The greatest weight thus far recorded is that of an Englishman who tipped the scales at 1,030 pounds.

The greatest dangers threatening corpulent persons originate in the heart and blood-vessels. In an obese person the heart is called upon to perform an increased amount of work. It is bound to supply the working muscles with blood, and a greater amount of work is naturally required of muscles that have to move a heavy body than of muscles moving a lighter body. This frequently results in overexertion of the heart, and in weakness and dilatation of its chambers. It is quite as dangerous if fat accumulates in the neighborhood of the heart, or even between the different muscular layers of this organ, thereby impairing the cardiac movements. An accumulation of fat in the thoracic cavity, at the diaphragm, or below the diaphragm in the abdominal cavity, also interferes with free respiration (asthma of the obese). Since the respiratory movements of the thorax form an important

PLATE XV

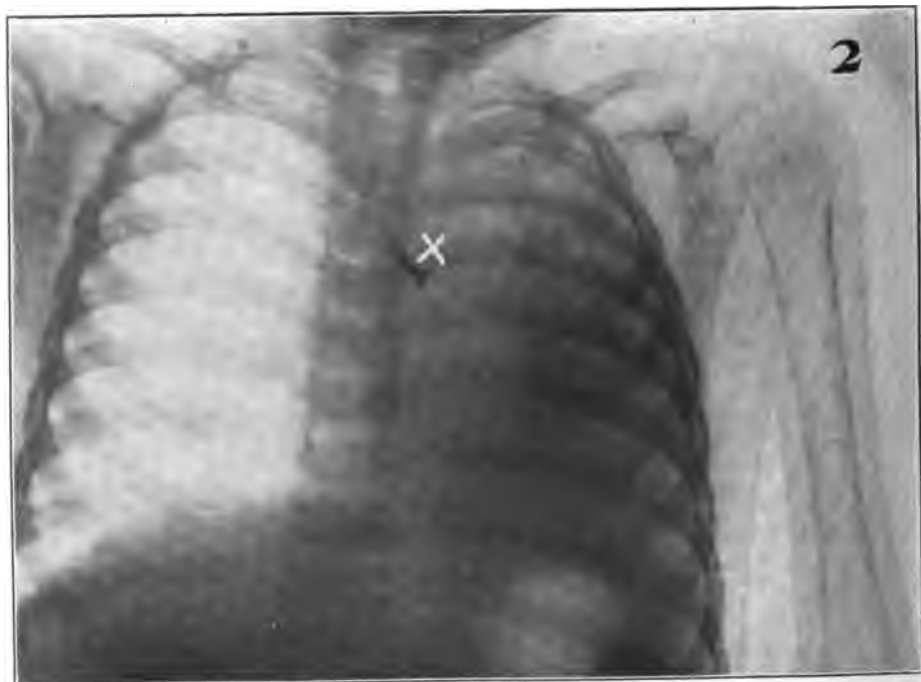
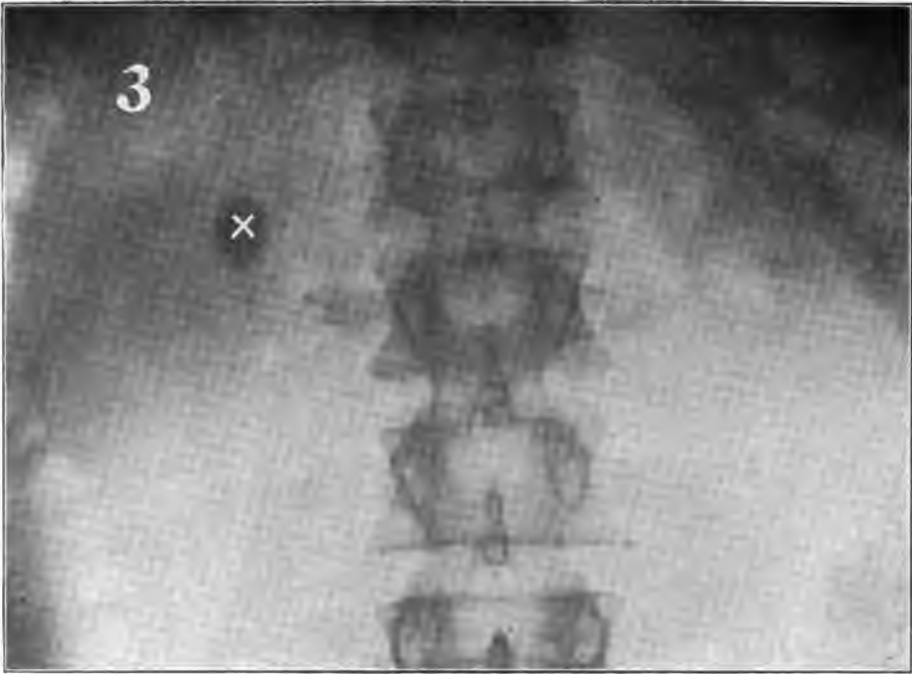


PLATE XV.---ROENTGEN RAYS

1. Human Skull, showing Bullet (X) lodged in Upper Jaw
2. Child's Thorax, showing Tack (X) lodged in Spinal Column
3. Stone (X) lodged in the Right Kidney of a Child
4. Stone (X) lodged in the Bladder of a Child at the Medical Office

PLATE XV.—ROENTGEN RAYS

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| 1. Human Skull, showing Bullet (X) lodged
in Upper Jaw | 3. Stone (X) lodged in the Right Kidney
of a Child |
| 2. Child's Thorax, showing Tack (X) lodged
in Spinal Column | 4. Stone (X) lodged in the Bladder of a Child
at the urethral Orifice |



auxiliary of the cardiac functions, any impairment of these movements will naturally act injuriously upon the heart. In addition, the obese are inclined to degeneration and calcification of the blood-vessels. As a result of this the blood-vessels become brittle and, in plethoric persons, are more apt to rupture at certain points; for instance, in the brain, causing apoplexy. They also impede the blood-current. Thus it is readily comprehensible that the heart, which is endangered in many directions, easily relaxes in the higher grades of obesity, and that a great number of corpulent individuals succumb to diminished heart-capacity, unless the danger is prevented in time.

Among other disturbances which are frequent complications of obesity, may be mentioned: Catarrh of the bronchi (owing to insufficient ventilation of the lungs), skin-eruption at points where folds of skin press against each other, venous tumors upon the legs and in the rectum (hemorrhoids), swelling of the liver, loss of sexual power, and a tendency to diabetes mellitus, gout, and to albumin in the urine (chronic Bright's disease).

Thus it will be seen that direct, as well as indirect dangers may result from obesity; and it is an important and by no means easy task on the part of the physician to decide whether the grade of obesity is such as to necessitate the beginning of an antifat régime. The decision is a very responsible one, as the removal of the fat is usually fraught with some danger, causing especially general weakness and long-lasting anemia. It is very important to choose the right moment and the correct form of procedure. It is to be regretted that many persons undergo antifat treatment without the supervision of a physician. There are numerous forms of antifat treatment, but it devolves upon the physician to determine which procedure is best adapted to the individual case.

The general object of all antifat-cures is a twofold one: (1) to restrict the ingestion of certain foods, thus preventing the formation of new fat; and (2) to increase the work of the muscles methodically, as this favors the combustion and elimination of fat.

Fatty and farinaceous foods, as well as sweets, must be looked upon as the most important generators of fat, and should, therefore, be avoided as much as possible. The restriction of all kinds of alcoholic beverages is quite as important. The extent to which these substances must be restricted is a technical, medical problem, and varies in the different individuals. The food should consist principally of meats containing a modicum of fat; such as beef, veal, mutton, pigeon, chicken, and venison. Cheese, skimmed milk, buttermilk, a few eggs, green vegetables and salads, fresh fruits or fruits stewed with very little sugar, weak tea and coffee, clear bouillon (from which the fat has been removed), and unsweetened fruit juices are also to be used. The finer varieties of bread are usually to be excluded, and the coarser breads preferred. In each individual case the directions

should be regulated by a physician; and the financial condition as well as the idiosyncrasies of the patient should not be overlooked.

It has been the object of much discussion whether obese persons, in order to throw off larger amounts of fat, should be permitted to drink unlimited quantities of water, or whether they should drink sparingly, especially during meals. Water is of little significance in an antifat treatment proper, but there is no question that many individuals are better able to carry out a restricted diet if the supply of liquids is likewise curtailed (about 2 quarts daily). If disturbances of the circulation have already taken place, water restriction is important.

With reference to the question of muscular exercise, individual rather than schematic directions are necessary. It is possible to render the success of the treatment questionable by exercising too little; on the other hand, too much exercise may damage the heart of the patient to such an extent that it can never be repaired. A great deal of physical work may be imposed upon some muscular persons, as in mountain-climbing. In anemic individuals, whose heart and muscles are weak, it is often necessary to begin muscular exercises very gradually, and to slowly increase their severity step by step with the increase in muscular power and the progressive removal of fat. Constant observation of the heart is necessary.

Some physicians at certain spas have elaborated systems of obesity-cures, some of which are valuable. Certain mineral waters, such as those of Kissingen, Homburg, and Marienbad, are widely employed. These cause free diarrheal movements. The treatment at Homburg is looked upon as the mildest; that at Marienbad, as the most severe and exacting. The Hot Springs of Virginia is a favorite resort for the wealthy in the United States. It is obvious that such cures require very careful medical supervision, as otherwise dangerous consequences may ensue. Since steam-baths have gone out of favor, sweat-baths, especially by means of electricity, have been extensively used. Many patients prescribe these baths for themselves or are induced by advertisements to go to institutions where they are given. Their influence is greatly overrated. The amount of fat lost is very small, and the loss in weight which is eventually noted is due to loss of water, and is usually a temporary one. Nor are these sweat-baths without danger, especially if the heart of the patient be weak or his blood-vessels brittle.

The use of thyroid gland preparations at one time promised well, but the hopes raised by enthusiastic therapeutists have not been realized in this line. The thyroid, by reason of its stimulating action on metabolism, is of service in some patients.

Those methods of treatment which aim at a careful and gradual reduction of fat are preferable to the exaggerated cures. An obese person should not believe that he may be able, with comfort, to undo in a few weeks all the harm which he has brought down on himself during years of inap-

propriate living. He should learn to regulate in a rational manner his entire method of living. This is most suitably accomplished by a term of treatment in a proper sanitarium. Experience proves that the results accomplished in such institutions are characterized by permanency. This is largely due to the fact that patients there learn readily and quickly how to act in order to remain healthy.

If an antifat treatment be instituted at the right time and in the correct manner, its influence upon the body is almost invariably excellent. It is even possible to compensate severe disturbances of the heart. But favorable results can be accomplished only when physician and patient work together in harmony; the former by careful consideration of all details, and the latter by self-denial and will-power.

OBSERVATION OF THE SICK.—Correct nursing of the sick is impossible unless accompanied by careful observation. Care, however, is not the equivalent of anxiety. On the contrary, the display of anxiety is harmful to the patient, and may prevent the attentive observation of his symptoms. It is necessary, therefore, to proceed calmly and considerately if one intends to observe the patient conscientiously. Exact measurements of the body-temperature is one of the first requirements. This is done with a clinical thermometer (see Fig. 308), which should be on hand in every household, as otherwise the onset of fever is apt to be overlooked. In order to judge correctly of the course of the fever, frequent measuring of the temperature is necessary. This should be done at least once a day, preferably between 5 and 7 p. m. In adults the temperature is usually taken in the armpit. The bulb of the thermometer is carefully inserted in the armpit, and the arm firmly pressed against the chest (see Fig. 310). Observe that the arm under which the thermometer is inserted should be supported; not the thermometer (see Fig. 309). An ordinary thermometer should remain in this position for from 3 to 5 minutes before the temperature is read. If it be impossible to take the temperature in the armpit (owing to a bandage, for instance), the thermometer should be placed in the closed mouth. In children it is more practical to take the temperature in the rectum. The temperature there is from $\frac{3}{4}$ to 1 degree higher than in the armpit.

The respiration of the patient is to be observed as to frequency (usually 16 to 20 per minute) and regularity. If any painfulness be present, this should be noted. Correct breathing should take place without obstruction and without coughing. In children respiration is at times accompanied by a depression (drawing in) between the chest and the abdomen. The sputum



FIG. 308. Clinical thermometer.

raised by coughing is of great importance in judging of diseases of the chest. The patient should expectorate into a receptacle filled with clean water or with a disinfectant solution, and provided with a cover. When the sputum is blood-streaked, or shows a rusty or saffron-yellow appearance, serious involvement of the lung is probably present. The occurrence of nausea and vomiting are important signs of disease, particularly in children. The vomitus is frequently of great importance in the diagnosis of disease. It should also be noted whether or not the patient appears relieved after having vomited.

The observation of urine and excrements is of the greatest importance. With regard to the urine, it should be noted whether it is clear or cloudy when voided, and whether it forms a deposit (sediment) upon standing.



FIG. 309. Holding the thermometer instead of supporting the arm.

FIG. 310. Correct way of supporting the arm when measuring the body-temperature.

The quantity of urine passed within each 24 hours should also be noted. Glass vessels should be used for the collection of the urine. The observation of the frequency and condition of the stools is of equal importance. Constipation persisting for more than 24 hours should always receive attention. In many gastric and intestinal affections of nurslings, an inspection of the stools is absolutely necessary; and the diapers of the affected child should, therefore, always be kept for the physician to see. Other important points to note are the color, odor, consistency, and number of stools during the day, and whether they are combined with blood, pus, or mucus.

The condition of the patient's skin must be carefully watched, and the attendant must find out from time to time whether it is perspiring, cold and clammy, or dry and hot. It is obvious that skin-eruptions should never be overlooked. Any abnormally pale, yellowish, or red color of the skin requires special attention. The appearance of scales upon the skin of children is of great significance.

The mental condition of a patient is of paramount importance. Incoherent talk is a significant sign in individuals who are apparently healthy; still more so in persons who are known to be ill. Delirium at night calls for strict surveillance, although this condition need not give rise to fear or apprehension. The same applies to sudden, spasmodic movements, to screaming, and to grinding of the teeth. The fact that a patient loses the faculty of moving an arm or a leg should, of course, never escape the notice of the attendant.

Close attention to the sense-organs is imperative. Even a layman will readily observe distinct symptoms of disease (redness, swelling, suppuration) manifesting themselves in the eyes. To overlook the appearance of a milk-like pus in the eyes of the new-born would be the grossest form of carelessness. The discharge of pus or blood from the ears, as well as supuration of the eyes, requires immediate medical aid. Sight and hearing may be examined by a layman to the best of his ability. If he entertain even the slightest suspicion of disturbances, a physician should be summoned. Discharges from the nose, especially if malodorous, require medical aid. It should be borne in mind that diphtheria of the nose sometimes occurs without involvement of the throat.

The appearance of dropsical swellings, especially in children who have just recovered from scarlatina, often escapes the attention of parents. If finger-pressure upon the back of the foot or upon the region of the ankle causes a distinct indentation to remain, it is a sign of a dropsical swelling of the skin. Such a condition may be caused by heart-diseases, kidney-disorders, etc.

OBSESSIONS.—Ideas which can not be extruded from the mind, and which impel the subject to continue to think certain thoughts, or compel certain morbid or fantastic actions. The trend of the thought, or the character of the action, is often important in designating such thoughts or actions as obsessions. The education of the individual is a certain factor as well. In ignorant and superstitious people, such thought-compelling actions may not be obsessional which in the educated could rationally be so considered. Thus, "Friday" superstitions, and the host of ideas clustered about the supposed unluckiness of the number "thirteen" can not be called obsessions in those who know no better; but when persons of enlightenment are impelled to do or not to do certain things because of the relations to Friday or to the number "thirteen," such impulses are termed obsessions. In general, however, the term has come to assume a more definite form as indicating a mental quirk or idiosyncrasy, if not an actual evidence of insanity. As in all phenomena of life extreme variability is the rule, no dividing lines can be laid down by which the presence of obsessional ideas alone may be considered as evidence of pure eccentricity, or may be regarded as indication of mental impairment.

Some of the more characteristic obsessions are seen in those who can not pass certain places without committing some slight act, in those who must wash their hands immediately on coming in contact with any foreign body, and in those who are unable to hear anything about sickness for fear of becoming sick themselves, or who can not look at the contents of a medical book without conjuring up all the maladies with which they might possibly be affected; these are all types of imperative or obsessional ideas. A great many such thoughts concern themselves with sexual ideas, and many patients afflicted with so-called "lost manhood" are in reality suffering from a form of mental disturbance, or obsession, from which they are unable to free themselves, largely through misinformation and lack of clear understanding of physiological problems. A type of obsession in which ideas of suicide are present is very frequent, and is often of grave import. As already indicated, hard and fast lines can not be drawn whereby a strict classification of all these obsessional states may be made. They are of frequent occurrence in the frank insanities, such as dementia præcox, general paresis, and in epileptic and hysterical insanities. In hysteria they form a characteristic background to the disease itself; and they are to be found in a number of other conditions shading into almost complete mental equilibrium and emotional stability.

Of recent years it has come to be felt that obsessions often represent almost the only symptoms of an extremely mild grade of mental affection, allied to the manic-depressive states, as some of the most characteristic obsessions are met with in manic-depressive insanity. French authors group them largely about the disease-forms of hysteria, neurasthenia, and psychasthenia. From this discussion it may be seen that these uncontrollable and recurring impulses to carry out certain definite actions are symptoms of a great many differing conditions; and when all of an individual's characteristics are taken into consideration they may be manifestations of simple idiosyncrasy or of a definite mental disease. For the latter the lay mind can do little; but by early recognition of the development of obsessional states in the young, parents can do much toward saving their child from a life of invalidism. It is extremely rare that such morbid ideas can be thrashed out of a boy or starved out of a girl. Too much attention to the morbid thought may be as deleterious as overlooking it entirely. Mental processes have a tendency to recur, and a thought once uttered, or even thought, is more easily repeated.

Constant repetition is one of the essential features in the development of obsessions, and efforts at repression are not usually effective in hindering the recurrence of an unwelcome idea, as every one knows who has tried to avoid uncomfortable thoughts that kept him awake. Dwelling on morbid introspections makes it a habit; and obsessions may be interpreted largely as complex habit associations. They can usually be broken up by the

sufferers if they seek enlightenment, and will follow the simple rule of distraction. It may be difficult to explain how; but one skilled in breaking up such thought-habits can usually give valuable advice. It is idle for a regular physician to pooh-pooh these problems. His patients seek further, and are often helped, if not cured, by irregular practitioners, hypnotists, and fakirs of various kinds. This is largely because the physician of the present day is so busy with more material forms of illness, that he does not believe he can afford time to investigate the petty affections of the mind; and furthermore, because tact, imagination, rare intelligence, and sympathy are more valuable than a ready materia medica or a facile scalpel. Consult Dubois, *The Psychic Treatment of Nervous Disorders*, New York, 1905. See also the article on INSANITY.

OCCUPATION DISEASES.—There are a number of conditions dangerous to health which are common to many occupations. In certain instances the workman is exposed to particular dangers, which are due either to the material under manufacture or to the conditions under which the work is done. In certain occupations a characteristic set of symptoms may have been associated with the same for centuries, and yet the introduction of a change in technique, or the adoption of precautionary measures, has almost immediately eliminated all danger.

Lead-poisoning is probably the most common and important of the so-called occupation diseases, not only on account of the severity of the resulting symptoms, but because of the frequency with which lead is employed. Chronic lead-poisoning, as a result of the handling of lead or its derivatives, may occur in workers engaged in reduction processes for metallic lead, in the manufacture of lead into various objects, in the making of lead compounds, in handling objects made from lead, and in various industries in which lead or its derivatives are employed. Those most exposed are the employees in factories making lead-colors, sugar of lead, or battery-plates; also type-founders, printers, painters, gilders, potters, glaziers, clay workers, and plumbers. The introduction of the lead into the body usually results from the ingestion of small particles with the saliva, food, or drink; less often from the inhalation of finely divided lead or of dust containing particles of lead. The pores of the skin, especially if perspiration is active, can also take up lead particles, which then are absorbed by the system. One peculiarity of lead is that it remains embedded in the tissues for prolonged periods, and is given off very slowly. This accounts for the fact that the continuous absorption by the organism of very minute quantities of lead may in time lead to the production of chronic lead-poisoning of a very severe character.

The actual treatment of the disturbances due to lead-poisoning must be left to the physician; and it is merely proper here to discuss the precautionary measures which should be carefully followed by both employers

and employees. Sets of rules and regulations have been prescribed for certain industries in which lead is employed, and which are mainly directed towards the maintenance of cleanliness in the workshops and an abundance of fresh air. The endeavor has also been made to impress upon manufacturers the advisability of substituting some non-toxic color for the very poisonous white lead-pigment.

In many industries contamination, particularly of the hands, by lead or its chemical derivatives, can not be avoided. In such cases the workmen must be instructed to cultivate extreme cleanliness, as their health and even their lives depend on this. To avoid inhaling dust which contains lead-particles, a special "respirator" or a moistened sponge should be worn in front of the mouth and nose, even though it makes the face uncomfortably warm and interferes with breathing. Food should never be taken into the workroom. If this can not conveniently be avoided, the eatables should always be kept in a dust-proof container, or else wrapped up in thick paper. Neither food nor drink should be taken in rooms where lead is being manufactured or employed; and before eating, and also when leaving the rooms, the hands, arms, face, and scalp should be thoroughly washed with soap and water, the nails cleaned, the mouth rinsed, the teeth brushed, and the nose cleansed by snuffing up some water. It is also well to wear special clothes while working. In some countries these are prescribed by law. Every worker in lead should take at least two warm baths every week; and where the body is apt to become contaminated by especially poisonous lead-pigments, such baths are necessary every day. Complete abstinence from all indulgence in alcoholic beverages is demanded, because experience has shown that drinkers are much more prone to be afflicted with lead-poisoning, and also have it in a more pronounced form than persons who are abstainers.

Yellow phosphorus is another poisonous substance which is employed in certain industries. It has been largely used in the manufacture of matches, but is now being gradually superseded by the less toxic, non-crystalline red phosphorus. The entrance of the fumes from these chemicals into the cavities of decayed teeth is apt to be followed by inflammation and necrosis of the jaw-bones, those of the lower jaw being destroyed more frequently than those of the upper. This severe disease is also attended with danger to life, and necessitates an operation which produces marked facial deformity. Sometimes there results extended and deep suppuration in the neck, and a general pyemia. Although many legal restrictions have been applied to the control of workers in match factories, cases of phosphorus-poisoning have been reported yearly. A definite result can be obtained only by entirely forbidding the use of the dangerous phosphorus. A new method has lately been devised by which matches may be made without the employment of this very toxic substance, and in this way a more favorable condition of affairs will undoubtedly be realized.

The fumes of mercury, if inhaled for a prolonged period of time, produce a chronic form of poisoning, to which workmen in mines and furnaces, mirror-makers, hatters, and makers of thermometers and barometers, are all exposed. The mercury is taken up through the mucous membranes, through wounds, and even through the unbroken skin. The system does not, as sometimes stated, become accustomed to the effects of mercury, but the harmful consequences appear sooner in one workman than in another. A feeling of heat in the mouth, a metallic taste, and salivation are the premonitory signs of chronic mercury-poisoning. Later on the gums become swollen, red, and sensitive, the teeth are loosened, and chewing becomes difficult. If the absorption of mercury continues, ulceration of the gums and other parts of the mouth follows, and sometimes there is pronounced sloughing of the soft parts. In very severe cases the inflammation may extend to the jaw-bones, and result in their destruction. Gastric and intestinal disturbances are usually present; and in women there are frequently disorders of menstruation, and miscarriages. A peculiar tremor of the hands and arms, which may involve also the legs, the face, the larynx, and the tongue, is very characteristic. The general health is gradually undermined, the strength declines, and the face assumes a very languid expression.

The manner of coating mirrors, and the method of exhausting incandescent-light bulbs, have been so altered as to be no longer dangerous. It now remains for science to devise some substitute for mercury in the remaining industries in which it is employed. Strange to say, it was among the mirror-coaters that it was found practical to eliminate the dangers of mercurial poisoning, by proper equipment of the workshops and changes in the methods of work, so that in this instance at least it would not have been essential to devise a substitute for the metal.

Workers in mercury, like those in lead, must observe extreme cleanliness. Workmen in the more dangerous branches should be selected with particular reference to their general good health, and well-preserved teeth. As soon as the process of decay attacks even a single tooth, work should immediately be stopped. If it has been found necessary to extract the offending tooth, the person should not resume his original occupation until the wound in the gum has been completely healed.

Chromic acid and its salts give rise to a peculiar affection of the skin and mucous membranes. If the dermal covering is unbroken, the effect is exerted very slowly. The slightest abrasion, however, is rapidly followed by the formation of ulcers, which quickly become deepened, and are cured with difficulty. Inhalation of the dust or fumes from chromic-acid salts causes severe irritation of the mucous membranes of the air-passages; and in addition to the inflammation in the throat and an increased flow of tears, there is present a continuous tickling in the nose, which produces a constant

desire to sneeze. Within a very few days particles of the nasal mucous membrane are thrown off with the dark discharge from the nose, although little pain may have been noted; and in a few weeks, sometimes even in less than one week, examination discloses a perforation of the cartilaginous septum of the nose. The outward form of the nose remains unchanged, because the bone and that part of the septum which is covered by the skin have not been attacked. Similar inflammations may involve also the larynx, or the bronchi and their branches.

Workmen engaged in handling chromic acid must take care not to injure the skin of their hands or other parts of the body; and even slight wounds must be carefully covered with a protective dressing. Careful washing of the hands and face, and frequent irrigations of the nose are essential. The employer should provide a suitable means of getting rid of the dust which is produced, and prevent it from circulating in the workrooms.

Poisoning of workmen from arsenic and its salts is comparatively rare. See ARSENIC-POISONING.

The condition known as brass-founders' ague has been recognized for a long time in workmen employed in the production of brass and German silver. A feeling of languor and exhaustion, and a sense of pressure on the chest may be observed within a few hours after beginning work, but more usually at the end of the day. This is followed by chills which may last for several hours. The face becomes pale, the features drawn, and the skin covered with cold perspiration. The patient becomes fearful and restless; and headache, nausea, and pain in the joints serve to increase his discomfort. The chill is usually succeeded by a rise in temperature, which is terminated by an outbreak of profuse perspiration. As a rule these symptoms disappear over night, after the person has vomited freely. A workman who has suffered a number of such attacks attains a certain degree of immunity. Some workmen remain immune to the effects of the fumes, others are affected only after having stopped their work for a time and then returned to it. The drinking of large quantities of warm milk is a good prophylactic measure. Airy and well ventilated workshops, together with suitable suction-devices over the melting-pots, are also a great desideratum.

The fumes of bisulphid of carbon, which is largely used in vulcanizing rubber, may give rise to a very severe form of chronic poisoning, marked especially by disturbances of the nervous system. The symptoms, which sometimes appear within a few weeks, at other times not until months or years afterward, consist in headache, vertigo, loss of appetite, a bad taste in the mouth, nausea and vomiting, abdominal pains, and constipation. To these may be added pains in the joints, itching, and hyperesthesia or anesthesia of the skin. Prolonged exposure to the poison is followed by

severe nervous disturbances, which in the beginning are characterized by a period of excitement, including extreme volubility, irritability, and spasmodic muscular contractions. This is followed by a period of depression, marked by muscular weakness, tremor, uncertain movements, fatigue, loss of memory, and confusion. Of even greater importance are the psychic disturbances, including insanity and mania. The quicker the patient is removed from the effects of the fumes, the better the chances of recovery. The prevention as well as the cure of the disease depend on an abundance of fresh air and avoidance of all alcoholic beverages.

The disturbances resultant to the general health from the inhalation of dust, are many and varied. They are fully discussed in the article on DUST DISEASES (which see).

Among occupation diseases must also be considered the many and varied affections of the skin produced by handling various materials, which often bring about prolonged disability, and sometimes necessitate a change of occupation. These conditions are popularly termed "itch," although the itch-mite has nothing to do with them, nor have the affections anything in common with the disease caused by this parasite. These inflammatory conditions of the skin are associated with a great many pursuits, including galvanizing, glass polishing, quinin manufacture, the production of tar and its derivatives, smelting of arsenical ores, cement work, baking, wood polishing, and gilding. Hydrofluoric acid produces deep ulcers, similar to those already noted in connection with chromic acid.

When metallic silver finds its way into the skin, small dark-blue spots appear in those portions that are exposed to the light. A more general discoloration is noted in workmen engaged in the preparation of silver nitrate (lunar caustic), especially in those whose duty it is to remove the little sticks from the molds and pack them (see Plate XIV. 5).

The staining of the skin by nitrate of silver does not seem to be connected with any effects on the general health, but the resulting inflammatory disturbances in the skin may disable the workman for a considerable period and, if he shows any particular susceptibility to the affection, may compel him to change his occupation. In order to avoid the trouble, persons thus employed should be cautioned to practise extreme cleanliness, to wash their hands thoroughly and often, and to anoint them with vaselin before beginning work.

OCCUPATION NEUROSES.—Term applied to a series of disturbances which occur in occupations where one group of muscles is more or less constantly employed. They usually disappear, especially at the beginning of the trouble, if rest of the particular group of muscles is enjoined. The symptoms do not always consist in cramps or spasms; but in many instances there is present a condition of fatigue, paralysis, or tremor, or sometimes only a pain after working, which frequently is the forerunner of more

serious consequences. This group of disturbances must be carefully distinguished from those discussed in the article on **OCCUPATION DISEASES**, where the trouble is due to some external cause, a poisoning, or other condition. In the class of cases here noted, an internal factor is the cause of the affection—an overexertion which interferes with the coordinated action of certain related groups of muscles, so that they no longer perform their allotted tasks. The same muscles, however, may functionate in a perfectly normal manner when called upon to carry out some other muscular effort. The cramps of writers, pianists, typewriters, violinists, stenographers, milkers, and telegraphers are among the most common of these disturbances. The first two are considered in separate articles. In the other cases the trouble is due to a painful contraction of certain muscles, or an inability to use these muscles because they are readily fatigued. These neuroses, as already indicated, can be traced to overexertion. The consequences appear much more readily when the body at the same time has been subjected to other enervating influences, such as acute or chronic disease, mental disturbances, injuries, etc.

Treatment is by no means a simple matter. The cause of the trouble must be taken into consideration in every case; and the principal therapeutic measures may be summed up in massage, gymnastic exercises, and electricity, combined with other methods which may be indicated by circumstances. Telegraphers' cramp may be prevented to a certain extent by covering the key of the Morse instrument with a suitable rubber cap.

OILS, FIXED.—Greasy liquids, composed of a combination of fatty acids (oleic, palmitic, or stearic acid) and glycerin. They are not miscible with water, but are soluble in ether or alcohol. The fixed oils differ from volatile or essential oils in that they evaporate at a much higher temperature. Unlike the latter, they leave a greasy stain on paper. There are various groups of fixed oils, including olive-oil, cottonseed-oil, linseed-oil, castor-oil, palm-oil, cocoanut-oil, lard-oil, whale-oil, etc. They are largely used externally as vehicles for more active substances. Internally, many fixed oils are useful as foods; and some of them, notably castor-oil and croton-oil, have distinct medicinal values.

OILS, VOLATILE.—Volatile oils are mixtures of substances found very widely distributed in nature from the lowest to the highest plant families. They give to plants their characteristic odors, and were eagerly sought by the ancient spice hunter, who was the prototype of the gold prospector of to-day. In ancient times spices were sought far and near, and the knowledge of perfumes was well developed before the middle ages. The science of the chemistry of volatile oils and the investigation of the more exact laws governing their action on the human body commenced at a more recent date, however. Only since 1830 has the chemistry of this class of

bodies assumed more definite form; and only in the past twenty years has the action of these substances been learned positively.

Volatile oils are primarily mixtures of hydrocarbons with combinations of the paraffin and the aromatic series of chemical compounds. They all contain carbon, hydrogen, and oxygen, and a few contain nitrogen and sulfur. Those containing the last-named substance belong to the more disagreeable volatile oils, such as that found in *asafetida*. Terpenes form the basis of most of these substances, and with them are mingled in various proportions ether, alcohol, aldehydes, phenols, and related bodies. The action of this class of bodies upon the human organism is, as might be expected, complex, since their composition is so varied. Many of them, particularly those rich in phenol (as oil of anise, oil of cloves, and oil of cinnamon), may be very poisonous, doses of five to ten drops giving rise to serious symptoms. In fact, most of the volatile oils are very active physiologically. The chief results are seen on the nervous system, and secondarily on the blood-vessels. They produce a mild stimulation, increasing the psychic action of the brain, dilating the blood-vessels, and causing perspiration. They also irritate the mucous membranes of the mouth, stomach, and intestine, and on account of this action they are widely used for the purpose of improving the appetite. In very large doses they give rise to severe symptoms of poisoning, with coma, collapse, urinary changes, and convulsions. The vast majority of volatile oils are employed as flavoring-agents, but it should not be forgotten that they have an action of their own, and when used in large amounts may bring about serious results.

OLEOMARGARIN.—Artificial butter made from oleo-oil, lard, milk or cream, and pure butter, the product being colored and flavored to resemble the natural article. It was first manufactured in France in 1869, by the direction of Napoleon III., who desired to obtain a durable butter for his navy. Since that time the product has been greatly improved. Unless it be known that loathsome fats have been used in its manufacture, and provided that it is not misrepresented to be genuine butter, there is no reason why oleomargarin should not be widely employed as a popular foodstuff.

The fat of freshly slaughtered cattle forms the basis of oleomargarin. After having been cleansed and reduced to small pieces this fat is melted, whereby the finer and more readily soluble fats are separated from the less soluble ones, the latter being used in the manufacture of tallow candles. The fluid fats are then mixed with milk in a certain proportion, and treated like cream in a butter machine until the fat-globules separate, as in butter. These globules are then kneaded, salted, and colored, and are made to taste like butter by the addition of aromatic substances (coumarin, etc.). The quality, as well as the price of oleomargarin, will depend on the quantity of milk added and on the amount of more solid fats retained. In order to prevent the fraudulent misrepresentation of oleomargarin as genuine

butter, most states have enacted laws making it compulsory to designate oleomargarin distinctly as such.

OLEORESINS.—Concentrated pharmaceutical preparations, usually prepared by the action of ether on crude drugs. Most of them contain a volatile oil and a resin. They are sometimes spoken of as *balsams*, although this term is usually restricted to those containing benzoic and cinnamic acids. There are officinal oleoresins of aspidium, capsicum, cubeb, ginger, lupulin, and pepper.

OLIVE-OIL.—A pale yellow oil, having a pleasant odor and taste. It is obtained from the fruit of the European olive. The ordinary table oil used for salads is supposed to be olive-oil, but much that is used in this country is cottonseed-oil, the two being almost indistinguishable. In medicine olive-oil is useful as a mild laxative, acting probably by stimulating the flow of bile. A couple of teaspoonfuls make a very serviceable laxative dose for infants. As an enema, this oil is very soothing and effective. In gall-stones and catarrhal jaundice, olive-oil acts by increasing the flow of bile and making it more liquid. The dose for this purpose is one or two tablespoonfuls, repeated several times a day. In states of low nutrition olive-oil is sometimes rubbed into the skin with satisfactory results.

ONANISM.—See MASTURBATION.

OPIUM-POISONING.—Opium is the dried juice obtained from the unripe capsules of the poppy. Morphin is its chief important constituent. The general knowledge of the pain-allaying and sleep-producing action of opium and morphin, and the fact that preparations containing quantities of these drugs may be obtained with comparative ease, serving almost as domestic remedies (cholera mixture, paregoric, Dover's powders, etc.), frequently give rise to poisoning.

The effects of opium and of morphin are very much alike. An overdose, taken either by the stomach or by hypodermic injection, causes symptoms of poisoning in about half an hour to an hour. These symptoms usually include vertigo, heaviness of the head, and faintness which soon passes into stupor or profound sleep. At the beginning it may be possible to arouse the poisoned individual for a few moments by calling or pinching him, or by dashing cold water in his face; later this may no longer be possible. In the early stages of poisoning, the skin is usually red and hot, and covered with perspiration; the pupils are usually contracted to the size of pin-heads; respiration is slow, long-drawn, and snoring. Later the face and the limbs become cool, pale, and bluish; spasms may occur; respiration becomes slower and slower, finally ceasing altogether, while the heart keeps on beating. If the course be favorable, respiration gradually grows more rapid; the skin becomes moist and warm; and the patient sleeps quietly and profoundly, often for 24 hours, after which he awakes very faint, with a mean headache, nausea, and pain in the stomach.

Treatment should consist in the immediate production of vomiting, or the stomach should be washed out by a physician. Decoctions of oak-bark, Russian tea, and strong, black coffee should be administered. Champagne, or a few drops of spirits of sal ammoniac in a small glass of brandy may be given; and mustard-plasters should be applied to the chest and to the calves of the legs. The patient must not be allowed to fall asleep, but must be kept awake by calling and shaking. If he be not too weak it may be advisable to walk him about.

Chronic poisoning (morphinism; opium habit) occurs in individuals who habitually take the drug. The habit may originate in various manners, but carelessness on the part of physicians is responsible for many cases. Weak-minded persons often acquire the habit from the frequent use of morphin or opium to allay trivial pains which might better have been treated with less dangerous remedies. Morphin by injection, but also opium or morphin taken internally, may, even after a short period of time, cause such a habituation to the drug that the unfortunate individual believes he can not live without it, even as the drunkard believes that he can not exist without alcohol. These habitués neglect their domestic and other duties, lose all mental hold on themselves, and finally become demented. At the same time they deteriorate physically. They lose their appetite, suffer various pains, become sleepless, restless, and anxious, and present a very miserable appearance. They are possessed of an actual passion for the beloved drug which they consider indispensable, and are thrown into a violent rage when unable to procure it. Many attempt suicide. Upon withdrawal of the drug they suffer from severe nerve-pains, sweats, diarrhea, and vomiting, and often from sudden loss of strength.

The only possible treatment is by withdrawal of the poison, either suddenly or gradually. For this purpose it is necessary that the patients be taken to an institution, not because of the severe bodily and mental affections to be treated, but by reason of the strict surveillance which is required to prevent the patients from obtaining the poison.

OPTIC NERVE, DISEASES OF.—See EYE, DISEASES OF.

ORCHITIS (INFLAMMATION OF THE TESTICLE).—See TESTICLES, DISEASES OF.

ORTHOPEDIC GYMNASTICS.—See GYMNASTICS.

ORTHOPEDICS.—The branch of medicine devoted to the treatment of affections which lead to morbid changes in the form of bones, joints, etc., and which are followed by a disturbance of the symmetry of the limbs. Neglected and little developed in former times, orthopedics has now become a greatly developed special science which, by a thorough study of the bones and muscles, and of their functions, rationally and successfully influences and heals the affections with which it concerns itself. The results are generally the more certain and the more permanent, the earlier the affections

are recognized and treated. Scientific orthopedic surgery should not be confounded with osteopathy.

OSTEOPATHY.—This term, which is derived from the Greek *osteon*, “a bone,” plus *pathos*, “suffering,” is applied to a curative system which has gained a certain number of followers. This system was invented in 1893 by Andrew T. Still, of Kirksville, Missouri, and is based upon the theory that the human body under ordinary circumstances contains within itself the fundamental principles for combating the invasion of disease-producing factors. In other words, the osteopaths claim that the tissues of the body harbor the necessary antidotes for all bacterial poisons, and is as a rule able to administer these to any organ when required. When, therefore, a diseased condition does occur, it must needs be due to the circumstance that the body has been prevented from meeting and overcoming the germ; that is, an obstruction to the fluid conveying the antidote has made it impossible to reach the affected part. Such an obstruction, the osteopaths assert, can be caused only by the displacement of some bone. The treatment, therefore, aims at locating the seat of this lesion, and at removing it by mechanical means if possible. Once this has been accomplished, according to the osteopaths, the body will again be able to carry on its normal self-treatment, and to overcome the existing disease without any outside aid. The methods employed consist in manual treatment tending to stimulate the activity of organs, muscles, vessels, and nerves, or to inhibit the functions of certain parts in order to divert more energy to others.

The osteopaths have built up a vast structure of empirical facts (most of which have been known for centuries) to which they have applied their own reasoning. The good that osteopaths, as practitioners, may do, should not be confused with the principles of osteopathy. The benefits to be derived from scientific massage and joint-manipulation are many, no matter what the theories may be in the mind of the manipulator; and there are undoubtedly many patients suffering from chronic joint-injuries who may be benefited by the enthusiasm and practise of the osteopaths.

Rheumatism is one of the diseases in which the so-called osteopathic treatment might most rationally be indicated, inasmuch as it might be possible in some cases to counteract the local pains by manual irritation of the affected joints. Leaving out of consideration the assertion frequently made by osteopaths, that dislocated joints, sprained tendons, or “twisted” vertebræ may be factors in aggravating the pains of a rheumatic condition, it may be said that rough manual massage is very often the only means of *exercising* the painful parts. And since exercise has a pronounced influence upon the circulatory functions, there is no denying the fact that such treatment may benefit the patient to some extent if he be able to stand it. The osteopathic treatment aims at stimulating the activity of the veins and

lymphatics by passive massage in the direction of their respective currents. At the same time the joints are freely exercised in all directions in which the nature of their construction permits them to be moved; and the muscles are forced into relaxation by kneading, stretching, and rubbing. It being part of the theory of the osteopaths that every ailment is responsive to treatment of the sympathetic nerve-center supplying the affected organ, an attempt is usually made to locate this ganglion in the spinal cord, and to stimulate the organ by manual treatment of the nerve.

Varicose veins is another ailment which may be beneficially influenced by radical massage of the parts affected. The condition being due to sluggishness of the blood which is being carried back to the lungs for oxidation, it seems within the scope of common sense to consider that manipulation of the parts in the direction of the current (toward the heart) will promote the passage of the blood. Stimulation of the vasomotor nerves may likewise be accomplished by therapeutic measures tending to exercise the tissues in which these organs run their course.

In certain diseases of the alimentary canal osteopathic treatment may be indicated, especially if the ailment is due to intestinal inertia. Careful manipulation of the intestine may bring about invigoration of the peristaltic movements, thus tending to remove an existing constipation, or relieve an accumulation of gases. That intestinal ulcers, or incarceration of feces due to volvulus, can not be relieved by such methods needs hardly be mentioned.

In cases of paralysis the circulation of blood in the affected parts may be beneficially influenced by radical massage. In apoplexy, which often renders one side of the body immovable, there is always the danger of atrophy because of the enforced inactivity of the muscles; and if artificial exercise of the muscles can be maintained until a complete or partial recovery has taken place, it will certainly benefit the patient. The osteopaths claim that the appearance of rash or boils is a favorable symptom, and it is possible to meet this assertion with the statement that such an outbreak may be the first indication of a renewed activity of the vascular functions in the affected tissues. The treatment, in a case of apoplexy, is usually confined to the region of the upper vertebræ, the tendency being to divert the surplus of blood from the head downward to the diaphragmatic region. Prolonged kneading and stretching of the musculature of the chest and back, as well as enforced movements of the diaphragm may tend to further this object.

In diseases of the kidneys and liver, the veins and arteries of the lower dorsal region are stimulated in the direction of their respective currents; and at the same time deep massage of the musculature of the lumbar and coccygeal regions endeavors to reach the nerve-branches supplying these organs.

In diseases which are accompanied by fever, the osteopaths resort to ordinary medical measures for causing reduction of the temperature; but

at the same time they assert that it is necessary to massage the tissues in order to render them "too healthy to harbor bacteria." From the various articles on febrile diseases it will be seen that the treatment must needs be indicated by the underlying cause of the affection. Fever is a *symptom*, not a *disease*. It would therefore be ridiculous to set down any specific treatment for such diseases, since the indications are so very varied in the different cases.

In some nervous diseases it is probably possible to effect an alleviation, if not a cure, by radical therapeutic measures. Rough massage of the various muscles, combined with hot baths and vigorous exercise, will cause relaxation of the muscles and an inhibition of the nervous functions. In cases of insomnia, for instance, such treatment would speedily indicate its possession of a certain value by causing the patient to sleep from mere fatigue. But in such a case the application of these methods would merely correspond to the administration of a narcotic; that is, it would influence the *symptoms*, not the *cause* of the ailment.

The examples here given will suffice to indicate the general manner of osteopathic treatment. Medical practitioners all over the world have long used many of the measures now employed by the osteopaths; that is, they have taught that in many diseases such therapeutic agents as gymnastics, baths, etc., might with benefit be employed as part of the general treatment. They should, however, be used with a degree of caution.

OVARIES.—For structure and functions, see INTRODUCTORY CHAPTERS (p. 77).

OVARIES, DISEASES OF.—Inflammation of these organs usually results from an extension of a similar process in the uterus or in the tubes. If the inflammation be very severe, one or both ovaries may suppurate, and death follow. Where the course of the inflammation is more chronic in character, a painful swelling of the ovaries is produced, which gives rise to symptoms similar to those of an inflammation of the tubes. The pains become especially marked if adhesion takes place between the inflamed ovary and the uterus or the rectum, for whenever the bowels are emptied the force of the act is transmitted to the tender organ. Just as the normal ovary influences the appearance of menstruation, so may the diseased organ bring on uncontrollable and exhausting uterine hemorrhages. The disease gradually exerts a very deleterious influence on the entire nervous system, and women thus afflicted are often accused of being hysterical.

The commonly accepted methods of treatment consist of hot douches, the introduction into the vagina of tampons saturated with various medicaments, baths of different kinds, and attention to the general health. If, after thorough trial, these methods prove unsuccessful, operative treatment must be considered. Thanks to the advances in modern gynecology, this needs no longer include the total extirpation of both ovaries, but merely the

removal of the diseased portions. In this way the woman retains her sexual characteristics, her menstrual functions, and the ability to conceive. The operation may usually be performed through a vaginal incision.

Ovarian tumors may become very large, and cause death within a period of three years. They may be of a malignant nature from the very beginning, especially in old persons; or they may become converted into malignant tumors during some period of their growth. The symptoms caused by their presence may be slight or very indefinite in character. The patients lose their appetite, complain of abdominal pain, are constipated, and become emaciated. These symptoms always demand a careful gynecological examination. The tumor itself may have attained the dimensions of a man's head, and extend upwards as far as the navel, before the patient becomes aware of any distension of the abdomen. Its presence is more apt to be observed by others, and if the patient is unmarried an unjust accusation of pregnancy may be made. Later on the effects of the pressure exerted on the other abdominal organs by the gradually growing tumor become manifest, the emaciation progresses steadily, and the abdomen becomes unduly distended. The patient finally dies from exhaustion, unless suppuration meanwhile occurs in the growth, or a peritonitis hastens the fatal issue.

Treatment consists in the complete removal of the tumor as soon as a diagnosis has been made. If the other ovary is found to be normal, it may be left together with the uterus. The earlier the operation is performed, the less dangerous it is. The opportunity to conduct it through a vaginal incision is also much better, and the result more certain of being favorable.

OVARIAN TUBES, DISEASES OF.—Among the diseases affecting the ovarian tubes the most important is inflammation due to extension of an inflammatory process in the uterus. This may be due either to an infection with gonorrhea from the male, or to wounds received during childbirth. Involvement of the peritoneum may result in acute peritonitis and death, or in a chronic inflammation of the peritoneum, with long-continued suffering and invalidism. The latter affection also produces, around the opening of the Fallopian tube, dense bands of adhesions, which bring about a partial or total closure of the organ, making subsequent pregnancies impossible. The mucus or pus, as the case may be, which is secreted by the inflamed mucous membrane lining the tube, can not find its way out through the narrow uterine end of the tube; and consequently it collects in its lumen, producing a swelling which may vary from the size of a walnut to that of a child's head. In addition to the severe pelvic pains, the patients are greatly debilitated by the profuse hemorrhages which occur at the menstrual periods. The milder cases are benefited by various hydrotherapeutic measures; but in severe cases the removal of the offending tube, or tubes, is indicated, which may often be done through the vaginal incision.

Massage in these cases, unless conducted by a very experienced operator,

may do a great deal of harm. Inflammation of the Fallopian tubes is the most frequent cause of tubal pregnancy which, if rupture occurs, results in a rapidly fatal internal hemorrhage, unless expert medical assistance can be quickly secured.

Tuberculosis of the Fallopian tubes is a fairly frequent disease. Removal of the affected tube may succeed in establishing a complete cure even in those cases where a peritoneal tuberculosis is already present, the tubercles and the dropsy of the abdominal cavity disappearing with the extirpation of the original focus of the disease.

OVARIOTOMY.—The operation of removal of the ovaries. See CASTRATION; OVARIES, DISEASES OF.

OXALIC ACID POISONING.—Poisoning with oxalic acid, which is used



FIG. 310 A. Oxygen tank, showing method of administering.

for cleaning brass and copper, and to remove ink-stains, may occur by mistaking it for sugar, citric acid, or Epsom salt. The manifestations are difficulty in swallowing, pains in the stomach and abdomen, retching, often bloody vomit, corrosion of the mouth and of the throat (white scars), diarrhea (often mixed with blood), and loss of strength. As an antidote lime-water should be taken by the glassfuls, either alone or mixed with milk.

OX-EYE.—See *Diseases of the Cornea*, s. v. EYE, DISEASES OF.

OXYGEN.—A gaseous element which constitutes about one-fifth of the air, and which is found in combination in many substances, organic as well as inorganic. So far as man is concerned, it is the vital part of the atmosphere, in which it is found in a free uncombined state. When air is drawn into the lungs it is exposed to a vast area of lung-tissue, which is very richly supplied with blood. The blood gives off certain gaseous waste-products, and takes up some of the oxygen of the air. The greater part of this oxygen combines with a substance found in the blood-cells, called hemoglobin, and is carried with the blood-current to the different parts of the body, to be distributed among the various tissues in need of oxygen. The fluid part of the blood absorbs about three-fifths of one per cent. of oxygen.

Oxygen is used by inhalation in various conditions. It is usually kept in metal tanks under pressure, and is administered through a mask which is connected with the tank by a rubber tube. Under ordinary circumstances the hemoglobin will absorb practically no more oxygen than usual, no matter how concentrated is the oxygen administered. The fluid part of the blood, however, will absorb up to three per cent. of oxygen from concentrated mixtures; and in conditions like asthma and chronic bronchitis, where the air-current is interfered with, oxygen will diffuse through the air-spaces much more rapidly than atmospheric air, and in this way give relief. Great benefit is often experienced from its use in the shortness of breath and dusky skin resulting from heart-trouble and pneumonia. It is useful for such forms of poisoning in which the hemoglobin has been damaged; as in poisoning from illuminating-gas, nitrites, chlorates, etc. Oxygen is some-



FIG. 311. Bed prepared for the administration of a pack.

times used in connection with anesthetics (as ether, chloroform, and laughing-gas), being said to render them somewhat safer, and to prevent to a certain extent some of the unpleasant after-effects. In severe anemia oxygen often gives relief, probably being carried to the tissues directly by the blood-plasma.

OZENA.—A disease of the nasal passages, characterized by an extremely fetid discharge. It is a catarrhal affection, and is usually associated with scrofula, syphilis, etc.; but may be caused also by the lodging of foreign bodies in the nasal cavities. In a more limited sense, the affection which physicians designate as ozena is one which is characterized by increasing thinness of the nasal mucous membranes and progressive atrophy of the turbinated bones. The nose becomes abnormally broad, and is constantly full of malodorous scabs. Ozena occurs more frequently in women than in men. A broad-featured face favors its appearance. The offensive odor is removed by daily douching with lukewarm salt water, but at least one pint of water is necessary for a douche.

P

PACKS.—Dry or wet cloths used for the complete or partial envelopment of the body, usually in order to induce perspiration. The complete moist pack is usually given in bed in the morning, for the purpose of warming the body so that a cold sponge-bath may be given. It may be used also at any time, day or night, to induce free perspiration. At least one hour in the pack is necessary for bringing on warmth. For producing sweating, two hours or more are required, because as a rule this process is not started until the patient has been enveloped for about an hour and a half.

The moist pack is applied in the following manner: A large, dry, woolen blanket is spread over the bed, and on top of this is placed a linen sheet which has been soaked in water, or in some specially prescribed solution, and then wrung out as thoroughly as possible (see Fig. 311). The patient, fully stripped, lies down on this sheet, which is then packed around him so that it touches every part of the body (see Figs. 312 and 313). The woolen blanket is thereupon wrapped over the sheet, so that it completely envelopes the patient (see Figs. 314, 315, and 316). By this time the patient will have overcome the preliminary shuddering caused by the wet sheet, and feels warm and comfortable. In about an hour and a half he begins to perspire, and in another half hour he may be freed. Then follow whatever supplementary measures may have been prescribed by the physician. If perspiration does not set in within two hours, the pack should be removed.

Some patients become frightened when the arms are enclosed, and for such individuals the three-quarter pack may be employed. This leaves the shoulders and arms free, but is otherwise similar to the complete pack (see Figs. 317 and 318). The pack applied to the trunk alone leaves both arms and legs free (see Fig. 319). Perspiration may be induced more rapidly by placing several hot-water bottles or bags alongside the patient (see Fig. 320).

Partial moist packs are employed for the purpose of congesting the blood in the skin of the region treated, to warm these parts, or to alleviate pain. A well-known form is the common hot-water application to the throat in cases of tonsillitis, or pharyngitis.

A dry pack is made by wrapping the patient in dry, hot blankets. This procedure may follow a warm bath in order to promote perspiration. Partial dry packs for the trunk, the arms, or the legs, need no further explanation.

PAIN.—Pain is the signal given to consciousness that some organ or organs of the body are in trouble. One learns very little of the true nature of the trouble from the character or location of the pain alone. For what pain is, is not known, any more than its opposite, the sensation of pleasure.



FIG. 312. Packing the patient in the wet sheet.

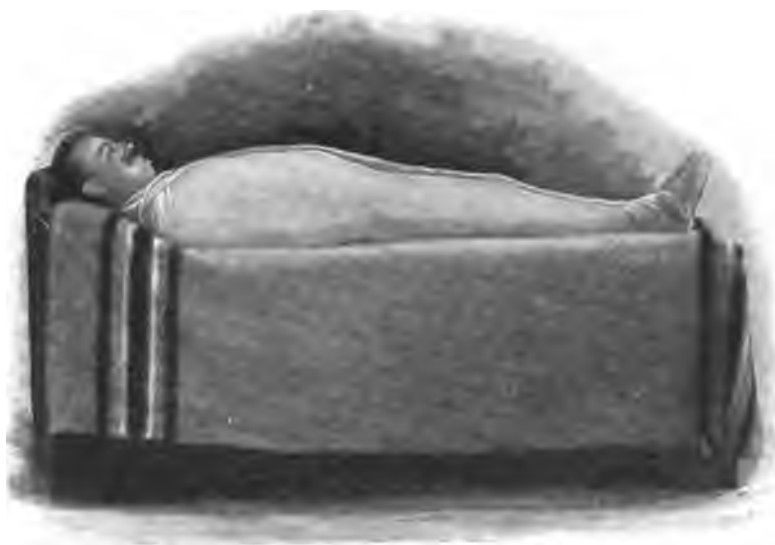


FIG. 313. Packing in wet sheet completed.



FIG. 314. Enveloping the patient in the woolen blanket.



FIG. 315. Securing the woolen blanket under the shoulders.

Both are primary, unanalyzable states of consciousness. Curious mixtures of pleasure and pain are subjects for the student of mental anomalies.

Pain is invariably associated with an organ in which there are sensory nerves, and is caused by some irritation or destruction of the fibers of those nerves; and the knowledge of the distribution of the sensory nerves of the



FIG. 316. Completed moist pack.



FIG. 317. Three-quarter pack. Enveloping body in sheet.

body affords strong evidence as to the probable location of the site of the trouble which is causing the pain. Hence the necessity for the physician's thorough knowledge of the anatomy of the human body if he would attempt to interpret the significance of a painful area. Inasmuch as such knowledge is obtained only by extensive study both of works on anatomy and of

the human body as well, it is self-evident that without such careful information the layman is very liable to make serious mistakes in the localization and interpretation of painful areas. For it is well known that while one



FIG. 318. Completed three-quarter pack.



FIG. 319. Pack applied to the trunk.

often finds a tender spot over the diseased organ, such as pain in the abdomen directly over the appendix, on the other hand one very frequently finds that, by reason of the distribution of the sensory nerves, pains originating

in certain organs are referred at great distances from those organs. Thus, pains due to heart trouble are often located in the shoulder and neck; pains originating in a displaced uterus are often referred to the hips or to the feet; pains due to a displaced hip-joint are often present in the knee; whereas diseases of the kidney, ulcers of the stomach, ulcers of the duodenum, even abscess of the brain may give no pain whatever. Thus the subject of pain as a guide to the location of disease is a very intricate problem.

Inasmuch as pain is a purely subjective matter, that is, something felt by the individual, it is extremely difficult to apply to it terms of comparison:



FIG. 320. Hot-water bottles placed alongside the patient to induce perspiration.

What one person would not mind another would be compelled to go to bed with. One finds great variety of reaction to pain in individuals, the tendency being more and more to bear less pain, because modern therapeutics has greatly increased its resources in overcoming this burden. Nevertheless, pain has been divided into classes, showing more or less distinct gradations. Thus one speaks of hyperesthesia, or increased sensitiveness, which passes into tenderness, and gradates into distinct pain. All three of these forms, arbitrarily so made, have significance in the interpretation of disease.

The subject of hyperesthesia is one of great importance, particularly to the physician, inasmuch as it often presents the only symptom of a beginning disorder of some internal organ. As the methods for testing hyperesthesia are so strictly technical and come within the domain of the neurologist, they can not be considered here; but it might be said that obscure

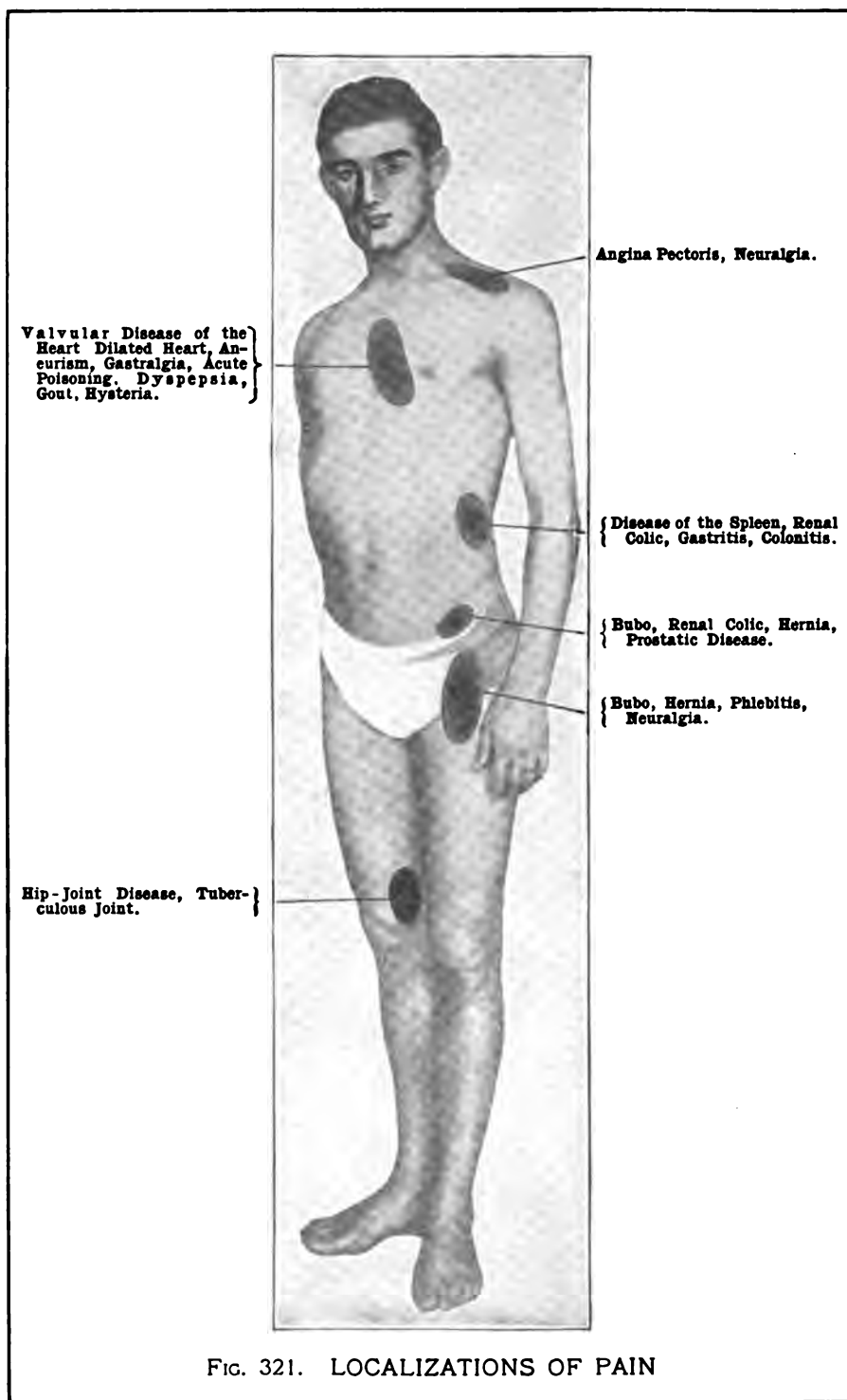
diseases, such as tumor of the spinal cord, tumor in the brain, tumor pressing on important nerve-trunks, abscesses in the nervous structures, etc., may all present the symptom of hyperesthesia and yet not be appreciated even by the person suffering from the disorder.

Some special hyperesthesias and their related paresthesias are: sensations of coldness or chilliness, sensations of heat, sensations of fulness, sense of oppression or weight, bearing-down feelings, sensations of faintness, sensations of itching and of the crawling of ants over the skin, sensations of numbness, tingling, and burning, the feeling of a band around the body, of throbbing, or of tightness. These all have their special significance.

Chilliness is a very frequent accompaniment of any form of subacute or acute poisoning; and it is usual in forms of poisoning which originate in the gastro-intestinal tract. Chilliness is due to constriction of the blood-vessels of the body caused by some irritating action on the nerves which control these vessels, the vasomotor nerves, and any affection which involves these is often accompanied by chilliness. Thus, in the beginning of an attack of migraine, or sick headache, the vasomotor nerves shut down somewhat, the circulation to the skin is diminished, and sensations of chilliness or actual shivering take place. Similar action comes about as the result of the poison of malaria; and the period of chilliness is indicative of the escape of the malarial parasites into the blood-supply. Chilliness is also often observed in affections of the intestinal region, being frequently premonitory to an attack of diarrhea or dysentery; and in the young it is a very prominent symptom in these affections.

Sensations of chilliness are further present in a number of other bacterial affections, notably in the presence of pus somewhere in the body, or as an accompaniment of some of the acute infections, such as measles, scarlet fever, etc. In some of the rarer forms of nervous disease—such as locomotor ataxia, syringomyelia, and allied disorders—chilliness is a not infrequent symptom, but is shown in a limited localization, so that one may feel the sensation of a chilly spot in the knee, or a spot on the buttock the size of the hand that is cold, or feel as though a cold towel were wrapped around the body. These local and circumscribed forms of chilliness are especially interesting to the student of nervous disorders.

Heat-flashes, either local or general, are as a rule less common than flashes of cold, and are much more frequent in women than in men. They are to be interpreted in much the same manner as the cold flashes; namely, instead of being due to local contractions of the blood-vessels, they result from local or general dilatations: hence, are brought about principally by nervous influences. The coming on of the change of life is one of the most influential of these causes, and hot flashes with cold sensations are very frequent at this time. Uterine diseases are also capable of bringing about similar flashes, and disturbances in the intestine due to obstruction in the



intestinal canal are also capable of causing such feelings. In nerve tire, or neurasthenia, and in paralysis agitans, irregular heat-sensations, shooting here and there, are not infrequent.

Sensations of fulness, either in the abdomen or the chest, are usually the indications of having eaten too much; but they may be due also to dilatations of the heart, to some form of peritonitis, or to a common form of chest disorder, pulmonary emphysema.

Impression of weight, when felt over the abdomen, is often the sign of the presence of some form of abdominal tumor; in the head it is more frequently associated with neurasthenia or psychasthenia, feelings of symptomatic depression being often associated with beginning insanity of adolescence, dementia præcox. When sensations of weight and oppression are felt in the chest, they may precede bleeding from the lungs; or they may indicate some form of nervous stomach disturbance, or grave indigestion or gastritis. Asthma, angina pectoris, hysteria, and exophthalmic goiter are often accompanied by feelings of oppression or weight in the chest. This weight in the chest is often associated with a feeling of constriction over the heart which is one of the distressing symptoms of angina pectoris, in its true and false forms. Certain attacks of acute indigestion, acute gastritis, are accompanied by this oppression in the region of the heart, and inability to get one's breath.

In disorders of the pelvis, such as fulness of the bladder, piles, diarrhea, uterine disorders, uterine displacements, etc., the sense of bearing down is very common.

Faintness, a sensation which may go on to actual loss of consciousness, may indicate a general nervous condition. More commonly it is associated with a lack of iron in the blood, as in the various forms of anemia. Excess of fatigue, excess of heat, and excess of emotional activity may also lead to faintness; and in some people delay in regular eating brings on this sensation of faintness, accompanied with a feeling of weakness at the pit of the stomach. Following a large stool, faintness is by no means an uncommon occurrence, particularly if the movement is accompanied with a large amount of wind and expelled with violence. The cause for this is quite in keeping with the sense of chilliness already described; that is, irritation of the vasomotors of the body; and in the case of faintness the vasomotors of the cerebral vessels are involved and the circulation in the brain slightly cut off. In some affections of the ear, notably in what is known as Menière's disease, and in some of the more severe heart disorders, such as angina pectoris and fatty heart, faintness is a common symptom.

Itching is a form of paresthesia which is usually associated with disturbances of the intestinal canal. It may extend over the entire body and in its severer grades develop definite skin eruptions, such as hives, or even herpes zoster. Certain diseases, such as diabetes, are associated with

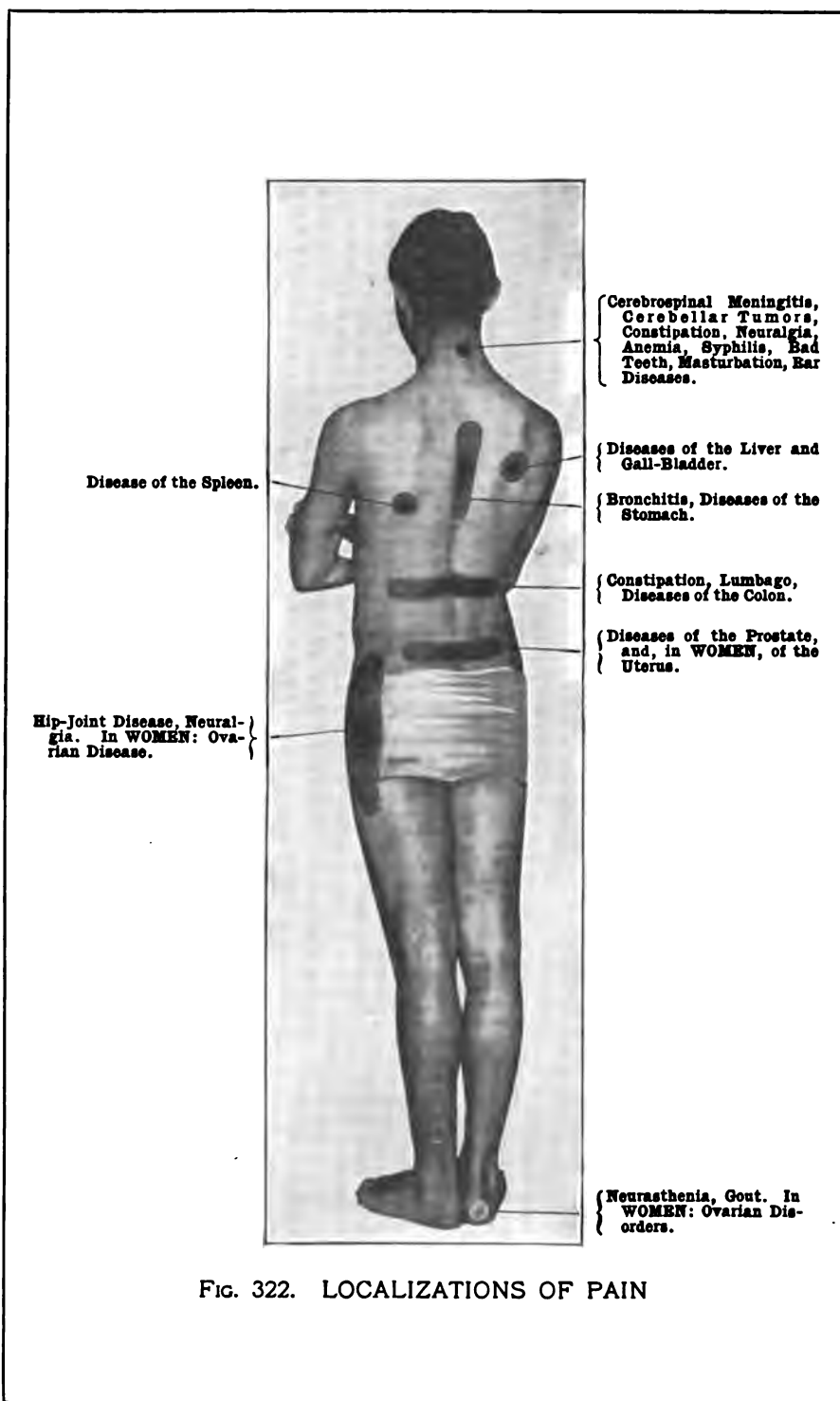


FIG. 322. LOCALIZATIONS OF PAIN

intense itching; and following a number of the exanthemata (measles, scarlet fever, etc.) the itching is predominant. In worms and in hemorrhoids, itching at the anus and nose is often present; while leucorrhea and cystitis are apt to cause itching of the genitals. A number of nervous diseases are accompanied by very persistent and sometimes localized itching. Such are tumors of the brain, apoplexy, meningitis, tetany, etc. Further, itching frequently follows the administration of certain drugs, notably morphin, arsenic, lead, copaiba, and ergot. Itching due to local disturbances of the skin from nettles or insect parasites or stings should not be overlooked.

Sensations of numbness and tingling are usually associated with grave nervous disorders, although in a number of rheumatic affections numbness and tingling in the fingers and toes are met with. The most important of the nervous diseases associated with tingling are apoplexy, tumor of the brain, meningitis, epilepsy, hysteria, neurasthenia, neuralgia, locomotor ataxia, neuritis, sciatica, and tetany.

Sensations of burning at the pit of the stomach are often due to an acid stomach, while a similar feeling in the back between the shoulder-blades is very common in acute bronchitis.

Coming to the subject of pain proper, it has already been mentioned that there is a great difference in susceptibility, and certain variations have been observed among the different races. Thus, the Latin peoples are more given to expression about their pains, while the Teutonic races are less liable to such outward manifestations. Still, the variations are more apt to be individual rather than racial. The most important thing to be remembered with reference to pain is that the individual feels it, and his expression can be taken at full value. Only by rational moral orthopaedics can one learn to avoid the expression of complaints with reference to pain.

The hysterical should always be borne in mind in this respect, inasmuch as they, consciously or unconsciously, lie about their pains, and manufacture them and conjure them up in infinite variety in order to stand in the lime-light of sympathy and attention. It should be remembered that intense pain can rarely be borne with a smiling and cheerful countenance, and when severe pain is present at the time of examination there is usually an increase in the rate of breathing, the pupils dilate, and the pulse is apt to be throbbing. Perspiration is not uncommonly found over the body surface, and often large quantities of urine are passed directly after or during the attack.

Of the various varieties of pain, one may distinguish between sharp or acute pain and dull pain. The pains may be radiating; that is, starting from one point and branching out like the branches of a tree, following the different ramifications of the nerves; or they may be shifting, going from one location to another: in the shoulder now, in the hip in fifteen minutes,

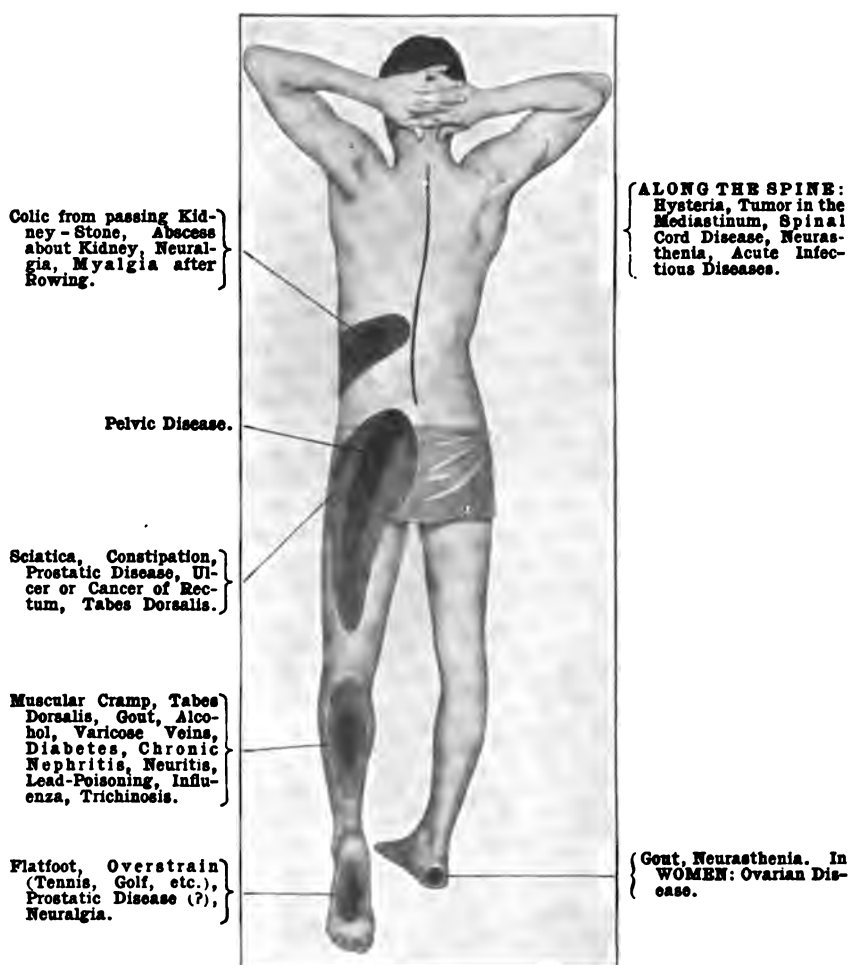
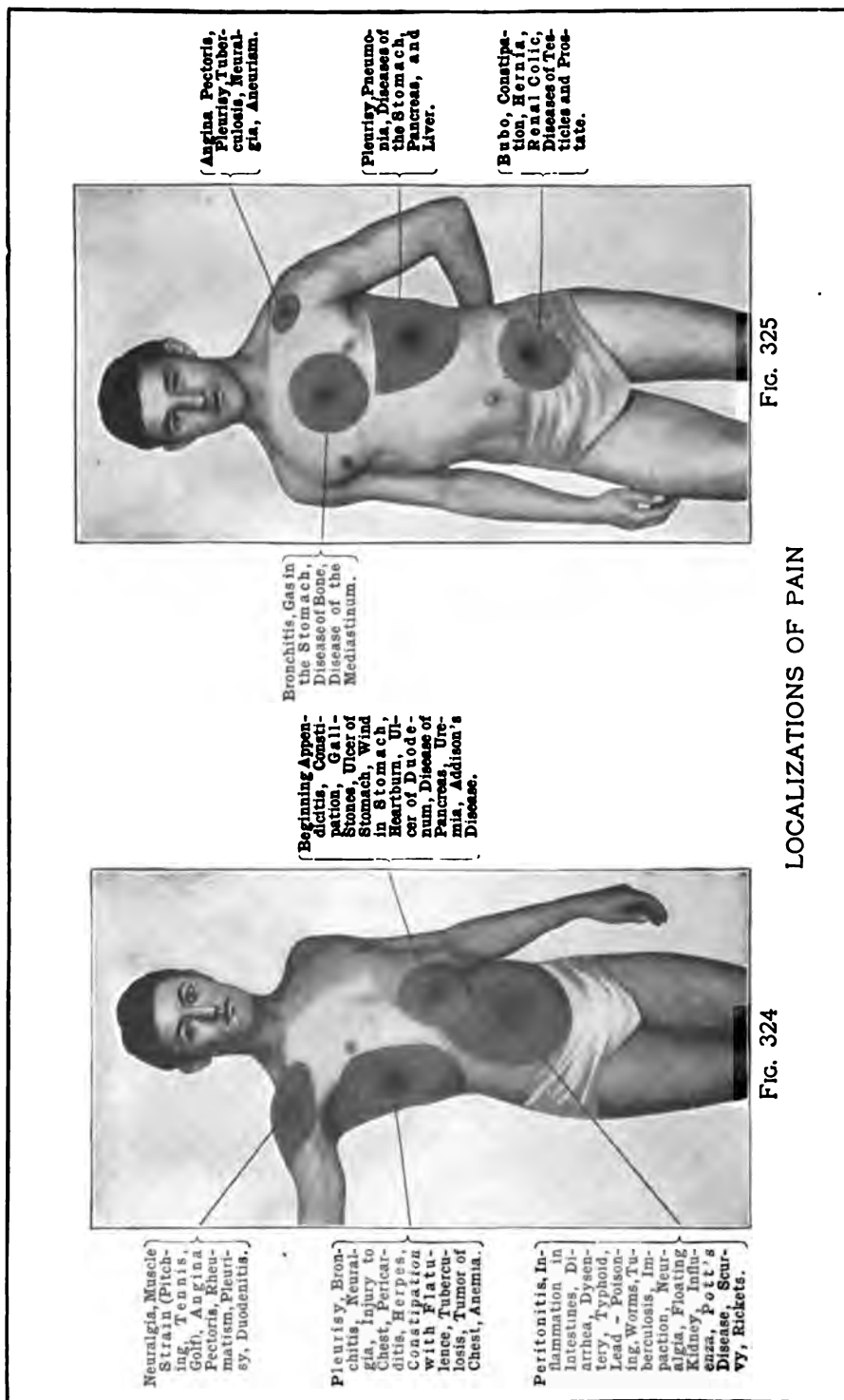


FIG. 323. LOCALIZATIONS OF PAIN



LOCALIZATIONS OF PAIN

and again somewhere else in the course of an hour. Occasionally the pain is one that commences very slowly and insignificantly, then gradually increases and rises to a point of extreme severity, then again dies down. Such are termed colicky pains, and are present in childbirth, in constipation with wind in the intestine, in diarrhea, in appendicitis, in gall-bladder disease, in kidney disease, and in dyspepsia. Occasionally pains may come in attacks or paroxysms, the patient being perfectly well as usual when suddenly he is taken with a severe pain in the back of the leg; this either continues for some time or it may cease in ten to twenty-five minutes, a sense of dull ache being left behind. This form is especially frequent in the neuralgias, particularly in sciatica.

Not infrequently one finds more than one variety of pain at one time. Sharp pain usually signifies that an acute process is going on somewhere in the body; and if persisting more than a few hours it is usually an indication that something organic is going on, as a rule an inflammation of some kind, either in an organ of the body or in a nerve-trunk, although acute inflammations of the nerve-trunks are characterized by radiating pains rather than by sensations of acute ill-defined pains in the body.

Dull pains, on the contrary, are more indicative of chronic processes; such as chronic inflammation in a mucous membrane, or slowly developing tumors, especially in the larger organs of the body—the liver, the kidneys, the spleen, etc. These organs being poorly supplied with sensory nerves, symptoms of pressure leading to dull pain are more frequent in them. Pain may be increased or decreased by movement, and one very frequently finds that the intense pain, for instance, of sick headache, is relieved by lying down, whereas pain due to wind in the intestine is helped by moving about; pain in joints, especially in inflamed joints, is greatly increased by motion in the joint, whereas the pain of hysteria may often be relieved by pressure.

The seat of the pain is often of great importance in determining the diagnosis; and although the subject is a very large one and there are many exceptions, it may be said that as a rule pain, if localized at all, is usually localized in the organ affected. But there are a large number of pains, called transferred pains, which are localized at the ends of the sensory nerves which somewhere in their course pass through the affected region.

These *transferred* or referred pains are a very interesting feature of this subject, and charts showing the location of the most important of these are therefore shown. It may be seen that diseases of the hip-joint are very frequently referred to the inside of the knee; that diseases of the ovary are often localized in the center of the thigh; and that affections of the large intestine and about the diaphragm may be referred to localities about the collar-bone, whereas gastric pseudo-cardiac affections are localized over the breast-bone. Uterine pain is often associated with irritation of the nipples, and dyspepsia very frequently is attended with transferred sensa-

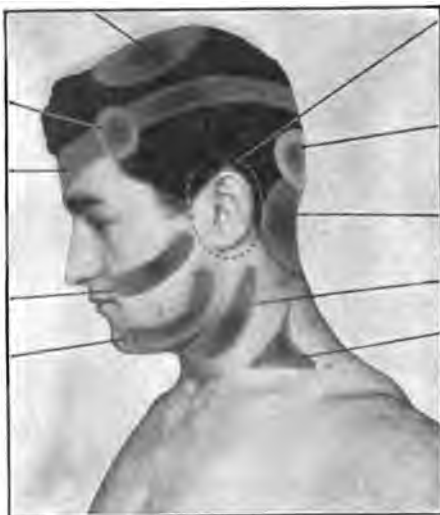
Anemia, Neurasthenia, Epilepsy, Hysteria, Constipation. In WOMEN: Uterine Diseases.

Sick Headache, Eye Strain, Constipation, Trigeminal Neuralgia, Ear Diseases.

Migraine, Eye Strain, Neurasthenia, Hysteria, Drug-Poisoning (Opium, Alcohol).

Neuralgia, Toothache, Disease of Antrum, Cancer of Jaw.

Bad Teeth, Neuralgia, Mumps, Actinomycosis, Stoppage of Salivary Glands.



Neuralgia, Mastoiditis, Ear Diseases, Mumps, Toothache.

In WOMEN: Diseases of the Uterus and Ovaries.

Neurasthenia, Constipation, Neuralgia, Depression.

Tonsillitis, Sore Throat (Diphtheria, Streptococchemia, Scarlet Fever), Laryngitis, Tuberculous Glands, Poisoning.

Tuberculous Glands, Spinal Bone Diseases, Muscular Strains, Tics, Aneurisms of Arteries, Tuberculosis of Apex of Lung, (Mountain-Climbing).

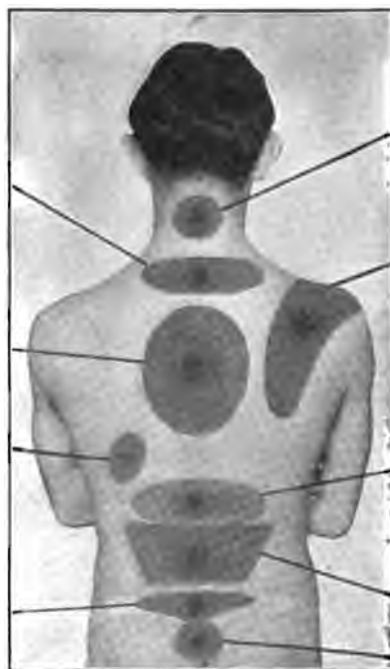
FIG. 326.

Pleurisy, Muscular Tire, Pericarditis.

Wind in Stomach, Spinal Cord Disease, Ulcer of Stomach, Bronchitis, Gastritis, Neuralgia.

Inflammation of Spleen.

Disease of Testicles, Prostatitis, Piles, Hip Disease, Neuralgia, Sciatica, Ulcer or Disease of Rectum. In WOMEN: Diseases of Uterus and Ovaries.



Cerebrospinal Meningitis, Tumor of Cerebellum, Neurasthenia, Hysteria, Constipation, Neuralgia, Anemia, Syphilis, Bad Teeth, Masturbation, Ear Diseases.

Heart Diseases (Angina Pectoris), Diseases of Liver, Gall-Stone Colic, Aneurisms.

Constipation, Spinal Cord Disease, Cystitis, Tire, Ulcer of Stomach. In WOMEN: Uterine Disorders.

Lumbago, Constipation, Floating Kidney, Kidney-Stone, Acute Infectious Diseases (Tonsillitis, Smallpox, Influenza, etc.). In WOMEN: Dysmenorrhea, Uterine Displacements.

Anal Disease, Worms, Hemorrhoids, Fistula, Abscess, Prostate Disease, Constipation, Neuralgia, Coccyx Disease. In WOMEN: Uterine Disease.

FIG. 327.

LOCALIZATIONS OF PAIN

tion in the loin. Ovarian disturbances are frequently associated with pains in the heels, and the pain of nerve tire or neurasthenia is often localized at the nape of the neck. Other localizations of transferred pain can be seen on the diagrams (Figs. 321-330).

The interpretation of these transferred pains is not simple, and only by patient inquiry and careful examination can their presence be utilized in the diagnosis of disease.

Pains in different portions of the body should next be discussed. The most important region for the localization of pain is the head; and in the accompanying illustrations may be seen some of the most important referred-pain positions as well as some of the positions due to direct involvement. The character of pain in the head varies considerably. It may be sharp and radiating, involving the side of the jaw or the back of the head, and running up between the ears or over the eyebrows; in that case the pain is almost invariably of a neuralgic origin, involving either the maxillary, occipital, or orbital nerves. Migraine or hemicrania is another of the important pains in the head. This is the classical "sick headache." It is very frequently one-sided, but not invariably so. In the great majority of individuals this type of pain is preceded by eye symptoms (blurs and colored figures in the eyes), and in from fifteen minutes to an hour the headache ensues, located over the vertex or over the eyebrows. It may be dull and boring in character, or it may be sharp and throbbing, and so intense that the slightest movement causes agony. Patients frequently become sick at the stomach, and after vomiting the pain is somewhat relieved. This is perhaps the most important of all the pains in the head, as well as the most common.

Headache due to anemia is another pain which is usually diffuse and mild, but persistent. The anemia may be due to loss of blood or to loss of coloring-matter in the blood. Here the pale mucous membranes, or the previous history of hemorrhage, is sufficient for diagnosis. This type of anemia is often associated with neuralgia-like pains in other portions of the body, and this helps to clear up the diagnosis. A very important type of headache is found in kidney disease. This is as a rule general, of a dull, heavy character, usually improving at night and when lying down, and growing worse after eating or following undue excitement. It is also frequently associated with marked anemia, and special attention should be paid to the urine to determine the presence of albumin. Poisoning by lead, alcohol, or mercury also produce some forms of headache. Disease of the nasal passages and frontal sinuses is likewise a prolific cause of headache. In these cases the headache is usually located directly over the nose, starting at the bridge and running upward. Pain in a line over the vertex of the head from one side to the other is frequently associated with chronic constipation or dyspeptic disorders. Pain due to excessive use of the eyes, or to

**Neurasthenia, Anemia, Hysteria, Epilepsy,
Disease of Bladder, Alcoholism.**

**Migraine, Neuralgia,
Eye Strain, Bad
Teeth.**



**{ Constipation, Neuras-
thenia, Alcoholism.**

Nasal Coryza.

**{ Gastric Disease, Eye
Disease, Cold in the
Head.
Cold in the Head, Eye
Strain.**

FIG. 328.

Bronchitis, Pneumonia.

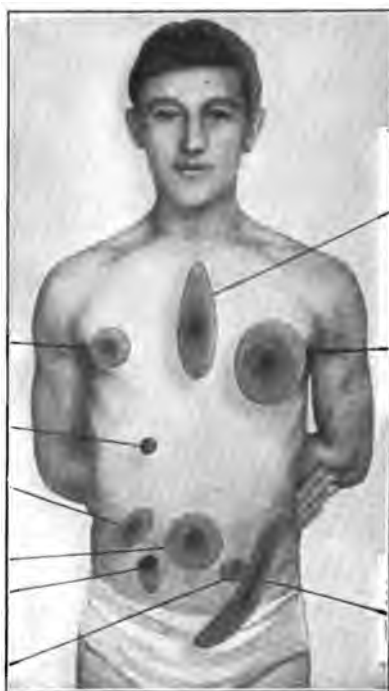
**Gall-Stone (Colic), Dis-
ease of Gall-Bladder. }**

**Intussusception, Consti-
pation. }**

**Beginning Appendicitis, }
Rupture, Gall-Stones,
Peritonitis, Disease of
Spinal Bones, Ulcer of
Stomach.**

Appendicitis, Constipation.

Volvulus, Constipation.



**{ Indigestion (Wind), Gas-
tric Disease, Bron-
chitis, Asthma, Influenza,
Pseudo-Angina,
True Angina, Aneurism,
Tumor of Mediastinum,
Tabes. In WOMEN :
Vomiting of Pregnan-
cy.**

**{ Stomach Dilatation
(Wind). In WOMEN :
Uterine Disease, Preg-
nancy, Menstruation,
Ovarian Disease, Neur-
algia, Diseases of Mam-
mary Gland.**

**{ Kidney-Stone passing
(Colic), Dysentery,
Hernia, Varicocele,
Bubo, Muscular Strain
(Skating, Horseback
Riding).**

FIG. 329. LOCALIZATIONS OF PAIN

eye-strain of one kind or another, is usually located directly over the eyes, or occasionally at the back of the head.

The pain of neurasthenia or nerve tire is most characteristic at the back of the head, over an area as large as the hand. Neurasthenic pains are also found in general throughout the head, and are frequently referred to by the patient as causing the head to be dull and "like a block of wood."

Many disorders within the skull give rise to pains in the head. Such are tumor of the brain, meningitis in its various forms (typhoid, cerebrospinal, tuberculous, etc.), and abscess of the brain. In these diseases the pain is usually of a dull, boring nature; very frequently, particularly in the case of syphilis of the brain, it becomes worse at night or in the late afternoon, even when lying down. Many of these pains are associated with changes in the eye-grounds which the physician can determine by means of the ophthalmoscope, when intracranial pressure causes changes in the retina readily appreciated by this instrument. Typhoid fever is frequently ushered in by a severe and persistent frontal headache.

Pains in other portions of the body than the head may also show definite localizations, and it is also true that in some forms no diagnosis can be made according to the site of the pain. The most important localizations are represented in the accompanying diagrams, where it may be seen that pains over the region of the breast-bone are usually due either to bronchial irritation or to tracheal irritation, particularly if located high up. If lower down, it is more apt to be a sign of disorder of the stomach, some form of indigestion. Some pains over the center of the sternum, however, may indicate diseases of the breast, or in rare cases it may be assigned to a dilated blood-vessel, an aneurism. Occasionally a tumor of the chest, occurring in the region known as the mediastinum, is responsible for pain in the chest. More commonly, however, the pains are due to bronchial irritation, influenza being a frequent cause.

Pains on the side of the chest, reaching toward the left nipple region, and particularly if they shoot up into the left shoulder or back under the arm, are usually associated with stomach or heart disturbances. In the vast majority of cases the stomach is at fault, less frequently the heart, although the sensation on the part of the patient is that it is the heart which is involved. Still, it is not infrequent that angina pectoris and fatty degeneration of the heart give rise to both sharp and dull pains in the region immediately to the left of the center of the body and about the left mammary region. Pains over the nipple itself, and surrounding the mammary gland, may be referred from either uterine or ovarian diseases. They are very common in menstruation or during pregnancy; and it should be especially borne in mind that pains in the mammary glands, occurring during lactation, may be due to congestion or to obstruction leading to abscess and severe disturbances of the breast. In cases of abscess of the breast the

pain is throbbing in character, and a softness and puffiness can be made out.

Pains in the lateral wall on the right or left side of the chest are most common in pleurisy and intercostal neuralgia, or sometimes following excessive muscular exertion. In individuals not known to have tuberculosis in any form, sudden sharp pain in the side of the chest or apex of the lung should be carefully investigated by a physician, as it so frequently happens that pleurisy in this region is the forerunner of a tuberculous process. Pains in this region are also common in pneumonia, and on the left side in pericarditis; and occasionally one has pain on the left side of the chest from an overloaded large intestine. Among some of the rarer causes of pain in this region may be mentioned: aneurism, tumor of the chest, disease of the spinal column, and occasionally hysteria.

It is frequently found that pain in the back, between the shoulder-blades, occurs as a result of acute bronchitis, particularly due to influenza; and flatulence and dilatation of the large intestine are also frequent causes of pain in this region.

Disturbances of the stomach, such as ulcer or dilatation or acute indigestion, may also produce pain in the center of the back between the shoulder-blades, where also some of the rarer affections, such as disease of the bone, or aneurism of the aorta, or acute articular rheumatism, may demonstrate their presence by localized pains.

Pains over the right shoulder-blade, running over the right shoulder itself, are usually neuralgic or neuritic in origin; and in housewives who have used the broom a great deal or in men who play golf and strain the right arm, or in younger men who play tennis constantly, severe muscular pains running down the arm are not uncommon. Occasionally the left arm shows similar disturbances. They are usually of a muscular, neuralgic, or neuritic character, and are helped by rest.

Very severe shooting pains in the right shoulder are not infrequently due to cardiac disturbances, and angina pectoris is often ushered in by severe pains of this character, particularly on the right side. Occasionally disease of the liver gives pain in this same region, particularly over the tip of the shoulder-blade, where gall-stones or acute inflammation of the gall-bladder or of the liver itself may record themselves in vague, dull, or acute pains.

On the left side of the back, immediately below the tip of the shoulder-blade, a sharp burning or dull pain sometimes indicates an involvement of the spleen. This is seen particularly in some patients suffering from malaria, and also in typhoid. Passing further down the body below the line of the nipples in front, one finds, usually on the left side between the waist and the nipple region, in the left hypochondrium, a number of painful diseases due to various causes. The most important of these are dilatation

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